

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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The First Rolling Mill in America.

BY W. H. HARRISON.*

The accompanying plans and elevations show the machinery of the first rolling mill built at Middleboro, Mass., for Peter Oliver, one of the Crown Judges in the province and a brother of Andrew Oliver, the Lieutenant-Governor, in the year 1751. They possess little scientific interest perhaps, but it is proper for this society to put on record, at its first meeting in New England, some account of the work of this section in the old time.

The designer and builder is unknown. The great man who made the money was Judge Oliver, who is now noted in local histories on account of his political connections, rather than for his knowledge of iron works. He was a native of Birmingham, England, and on this account may have had some knowledge of the business.

At the time the mill was built there was a law prohibiting the making, importing or using of machinery for rolling or slitting iron in the colonies. This was to protect the home manufacturers. Judge Oliver, on account of his political connections, was granted a special privilege to import and use this machinery; hence it is supposed that this was the first mill for rolling and slitting iron that was built in America. The Judge worked the mill till 1776, when he embarked in great haste for England on board of a British man-of-war. The mill passed into other hands, and was worked with varying success until 1830, when it was abandoned. S. Tilden, Esq., of New Castle, Pa., furnished a description and dimensions of the mill and the method of operating it in the year 1818, at which time he was working in it as a boy.

The business of the mill was to roll down the hammered bars made at the charcoal forges with bars about 3 x 1/4 inches, and slit them down into nail rods of 5-16 inch width. There were no such things as cut nails previous to 1818.

The bottom roll of the rolling mill was driven by an undershot water wheel, 18 feet diameter and 10 feet face, at the left-hand side, and the bottom roll of the slitter by a similar wheel at the right hand side, 8 feet further up the stream. The top roll of the mill was driven by a counter-shaft and 8-foot cog-wheel, gearing into a similar cog wheel on the right-hand water-wheel shaft, and the top roll of the slitter by a similar wheel gearing to the left-hand water-wheel shaft. The speed could be equalized between top and bottom rolls by raising or lowering the gates a trifle, until the bars would come through without turning up or down.

The shear was operated by a wrought-iron lever, which was lifted up by a cog upon the water-wheel shaft, as shown in the plan. The roll stands consisted of bed plates, as shown, each with four wrought-iron posts 5 inches in diameter, keyed below. The bolsters forming the top and bottom supports for the wicks, or journals of the rolls, were all cast iron from the same pattern, with a hole at each end, by which they could be slipped over the columns and cobbled up with blocks and wedges in the manner familiar to rolling-mill men.

The rolls were tightened or loosened by driving the long keys at the top of the columns. The rolls were 36 inches long by 15 inches at the ends, which were chilled; the necks were 9 inches in diameter.

The iron was reduced, in four passes, from 3/4 x 3 inches to 1/4 x 3 inches. The spindles were of wrought iron, 6 inches square. Water-wheels, cog-wheels and shafts were of wood, with cast-iron gudgeons running in timber boxes. The head of water was about 10 feet, and the speed about 15 revolutions per minute. The iron came from the forges 3 x 1/4 inches by 8 feet, and was cut into three lengths, heated in the furnace with fine sticks, then rolled and slit into nail rods.

In 1818 Capt. Zenas Crocker was the manager, and some eight men were employed at about \$1 per day. Six heats of about 800 pounds each were made in 12 hours' running; one pint or more of rum was consumed for each heat, according to the weather. The value of the forge iron was \$100 per ton; of nail rods, \$120; and nails were 12 1/2 cents, or "nineteen," per pound. The rods were put up in bundles of 56 pounds, and the nailers who had their little shops around the country were expected to bring back 50 pounds of headed and pointed nails, receiving "store pay" of calico, tea, rum, molasses, &c. About 1818 Mr. Jesse Reed, of Kingston, Mass., brought out the machine for cutting nails in pretty much the same form as it exists to-day. This did away with the old business of slitting, except for horseshoe nail rods. But the old mill was kept running, making flat plates, from which nails were cut across the bar, the forge iron being of such good quality as to admit of this treatment. Improvements in rolling followed; the timber fuel got scarce, and the old mill was abandoned and wrecked.

Underground telegraphy is to have a trial in Philadelphia, the city councils committee on police and fire alarm telegraph having, by a vote of 11 to 5, after a long debate, adopted a resolution granting permission to the National and Municipal Electric Under

Ground Companies to lay underground wires or conduits under certain streets, provided one chamber be given free of charge to the city. The companies are to give bond for the faithful performance.

METALLURGICAL NOTES.

THE ELIMINATION OF SULPHUR FROM PIG.

In a communication to the *Société de l'Industrie Minérale*, M. Rollet has given the results of some preliminary experiments made to desulphurize pig iron, with a view to making it fit for the basic process. Accord-

which had been obtained during the blowing of a charge in a basic converter. The metal obtained held 0.145 per cent. of sulphur, but it took three hours to effect the operation, so that it was too costly. Later, at Chamon, France, M. Rollet treated pig iron holding 0.820 and 0.318 per cent. respectively, and obtained a metal holding 0.088 and 0.015 per cent., with, it is stated, better results in other respects also.

THE BOTTOMS OF BASIC CONVERTERS.

Prof. Richard Akerman, in an admirable review of the basic process, gives some data of interest as to the making of bottoms for

results still. As it is, the average life of a bottom at Hoerde has been 8 blows, and has reached 16. Their destruction not alone involves a loss of time and money, but the neck of the converter is filled up by materials loosened from the bottom. When separate tuyere blocks are used, they are made either of the same materials or of ordinary refractory material. They do not outlast more than two or three blows. At Witkowitz entire brick bottoms have been tried with some success. From all that Prof. Akerman states it is evident, however, that the Europeans are strongly backward in this respect, and submit to a loss of time which

working order, and proved to have a temperature of about 2000° C. (3632° F.) But when the intensity of the red and of the green of the two spectra had been rendered equal, variations were observed which indicated that the temperature of the furnace varied from 2000° C. both ways. These variations are easily explained by the smoke in the furnace, and by the mixture of gaseous layers of different composition and different nature at times. Sudden changes are brought about by a change from an oxidizing to a reducing flame. During the time between reversing the valves, slow and regular variations of temperature have been observed, starting with a maximum; soon after reversing, the temperature sank gradually as the regenerators lost their reserves of heat by the passage of the air. The opening and closing of the working doors, too, caused passing variations. M. Crova and engineers Bouvard and Osmond, who co-operated with him, made experiments during the casting of an open-hearth charge also. The time required for casting is long enough to make several determinations possible and to allow them to be controlled by different observers. The temperature was about 2000° C. and the measurements were particularly exact with steel for large ingots, and the gentlemen believe that they possess a practical value. The temperature of pig iron when being run into the neck of a Bessemer converter varied, according to measurements made, from 1110° to 1150° C. (2030° to 2100° F.) The measurement of temperatures below 1000° C. presented difficulties.

SOME PROPERTIES OF BASIC CINDER.

M. Alexandre Pourcel, of Terrenoire, who is probably the ablest critic of the basic process in Europe, and who has contributed much toward a better understanding of the chemical reactions accompanying it, has recently communicated to the *Société de l'Industrie Minérale*, of St. Etienne, the results of some interesting experiments. It was held by M. Rollet that a sufficiently basic silico-phosphate of lime, magnesia and alumina did not yield its phosphorus to melted pig in contact with it, but that if this silico-phosphate was mixed with phosphate of iron the latter is reduced by the pig, which absorbs the phosphorus. The matter is an important one, as it affects the question under what circumstances phosphorus is driven back into steel by the final addition of spiegelisen or ferromanganese. The following experiments were made: In a plumbago crucible lined with calcined dolomite, one kilogram of white pig, holding 0.06 per cent. of phosphorus, was mixed with 225 grams of a cinder prepared so as to contain:

Silica.....	15.00	Magnesia.....	20.62
Phosphoric acid..	9.40	Alumina.....	5.50
Lime.....	58.75	Sulphur.....	0.73

In two hours the charge was melted. The iron cast weighed 997 grams, and contained 0.101 per cent. of phosphorus, while the melted cinder held 14.30 per cent. of silica and 10.44 per cent. of phosphoric acid. Notwithstanding its prolonged contact with the silico-phosphate the pig had absorbed but little phosphorus, and it is reasonable to assume that during the short reaction of the basic process much less would be taken up.

The same experiment was repeated in a plumbago crucible lined with "vegetable black," and the cinder was so chosen as to hold the same quantity of phosphoric acid, but 20 per cent. of silica. In this case the pig, after melting, contained 0.605 per cent. of phosphorus. In a third experiment in a crucible prepared in the same way, a kilogram of the same pig was melted with a mixture of 112 grams of the cinder used for the first experiment, and 41 grams of phosphate of iron containing approximately 15.5 grams of phosphoric acid and 25.5 grams of oxide of iron. This cinder was, therefore, composed as follows:

Silica.....	10.90	Magnesia.....	7.80
Phosphoric acid..	17.30	Alumina.....	4.00
Lime.....	41.00	Oxide of iron.....	17.00

The iron obtained after melting for two hours held 0.640 per cent. of phosphorus. If the entire quantity of phosphorus had been reduced the metal ought to have held 0.680 per cent. It would follow from this that the reintroduction of phosphorus into the metal during the addition of spiegel is proportionate to the quantity of phosphate of iron dissolved in the cinder, and to the quantity of spiegel added. If the phosphorus is present as silico-phosphate of lime it is not much affected.

THE CASPERSON CONVERTER LADLE.

Prof. Richard Akerman has addressed the following letter to the Iron and Steel Institute: "In consequence of your kind letter of March 31, I have asked for the results of the Caspersen converter ladle, both at Westanfors and at two other Bessemer works, Nykroppa and Bjomeborg, where the converter ladle has been introduced this year. At Westanfors the results are still corresponding with those given in my paper. To the 16th instant there has, with the converter ladle, been produced 102,904.35 centners pig iron, 90,550.35 centners (or 88 per cent.) cleaned ingots, and 91.65 centners (or 0.09 per cent.) scrap, but before the introduction of the converter ladle they only got about 84.5 per cent. cleaned ingots and 2.5 per cent. scrap. At Bjomeborg, when making soft Bessemer iron before the introduction of the Caspersen converter ladle, they got less than 83 per cent. of cleaned iron ingots and 3.4 per cent. scrap. With the converter

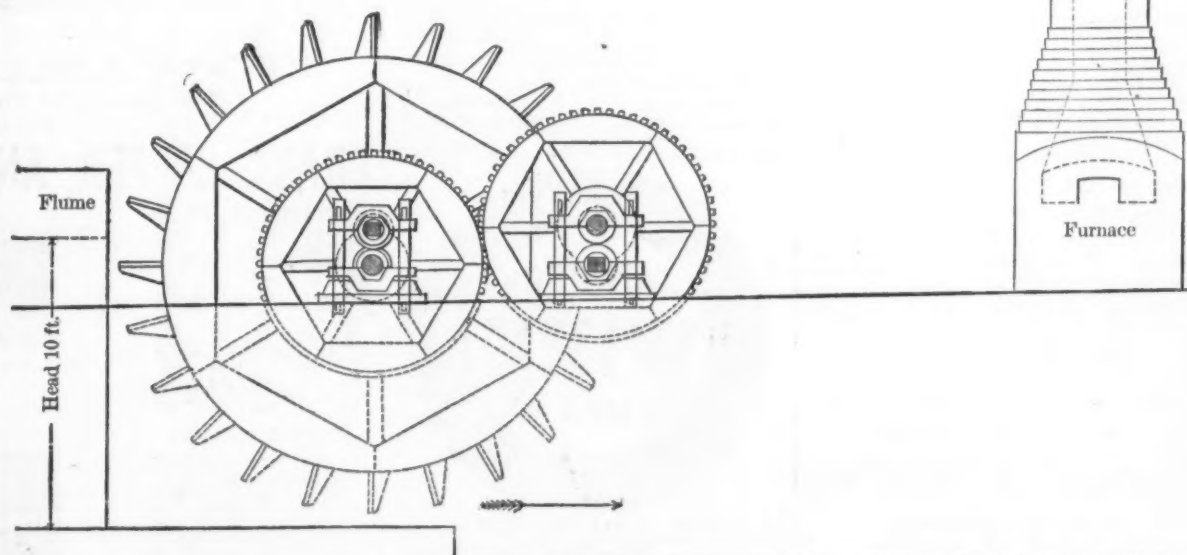


Fig. 1.—Elevation.

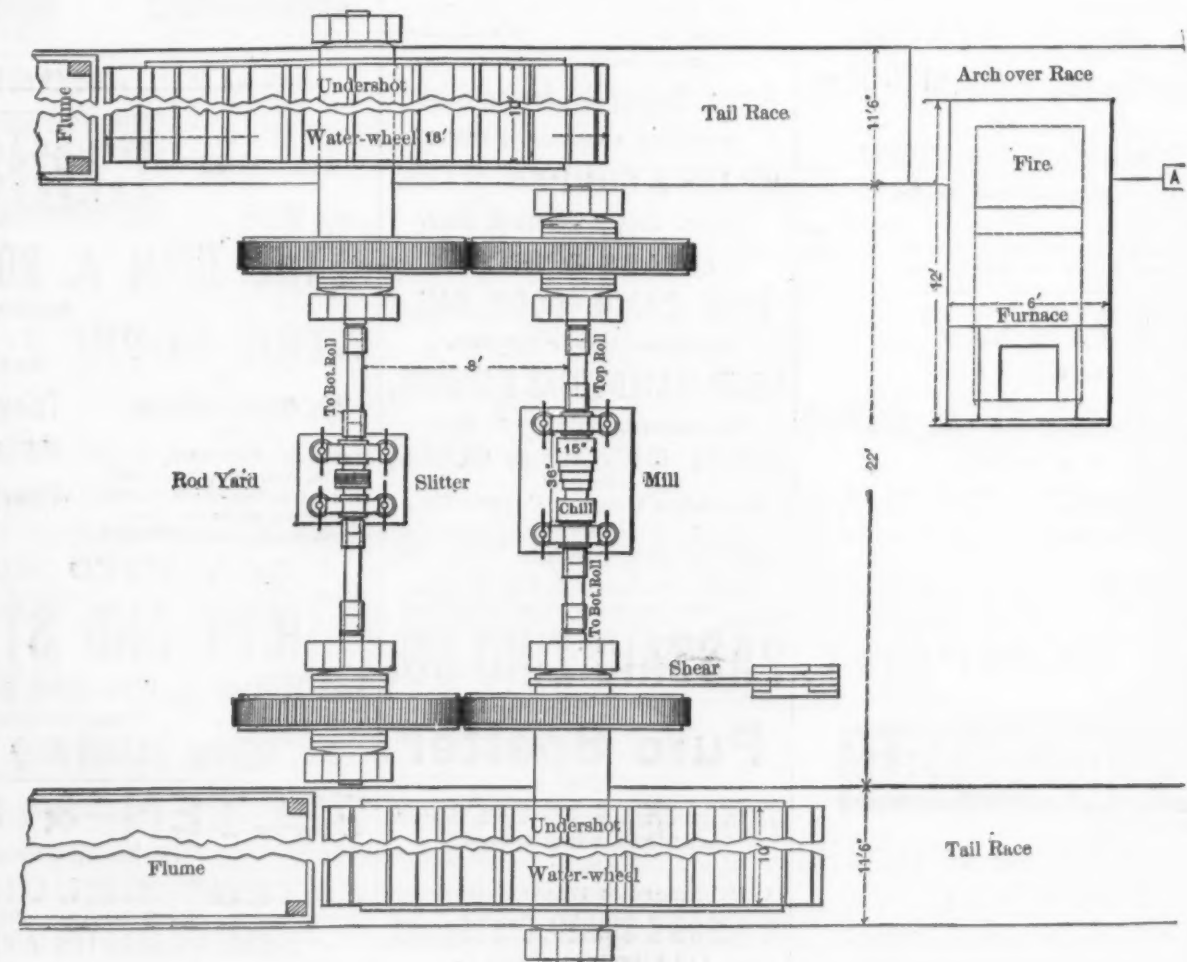


Fig. 2.—Plan.

THE FIRST ROLLING MILL IN AMERICA.

ing to circumstances, among which the presence of manganese seems to be the most potent, the elimination of sulphur during the blow ranges from 40 to 75 per cent. This may bar some grades of pig, otherwise suitable, from being used in the Thomas process, because even high heats and an excess of lime in the blast furnace may not bring the pig to proper quality, especially with silicious ores. M. Rollet has made a series of experiments, in order to prove that it would be possible to separate the sulphur from the pig by melting it with very basic cinder. In crucibles this has proved very successful, the reduction of the sulphur being, for instance, from 0.552 to 0.050, and from 0.634 to 0.019 without much change of the quantity of the other constituents. He charged 75,077 pounds of pig, holding 0.847 per cent. of sulphur, into a reverberatory furnace, adding 660 pounds of cinder, half of

the converters at various European works. In most of the works the bottoms are rammed of a mixture of hard-burned dolomite ground to a coarse powder, to which 5 to 7 per cent. of coal tar has been added. It is said that at Witkowitz pulverized lime is also added. The bottoms are rammed with warm rammers, and there must be at least 40 to 50 layers in a thickness of 16 to 17 inches. The tuyeres are either formed by ramming around steel pins which are afterward withdrawn, or around iron plugs, in place of which tuyere blocks are afterward put. The bottoms are exposed to a red heat at Hoerde, while at Ruhrort, when their durability is better, they are inclosed during the burning in iron molds provided with an iron cover, and Prof. Akerman hints that this method is preferable, and that another process to be brought out at an early date, tending in the same direction, promises better

would never be tolerated in an American establishment.

THE OPTICAL MEASUREMENT OF HIGH TEMPERATURES.

M. A. Crova has communicated to the *Revue Industrielle* a brief general account of some experiments made at the Creusot Steel Works to determine high temperatures by optical means. The first trials were made with open-hearth furnaces, and it was found that the simplest and most convenient way consisted in projecting, by means of a lens upon the reflecting prism of a spectropylometer, the image of a circular orifice through the door of the furnace. It was easy to observe in this way—even in full daylight—the two spectral bands of the red and green regions, of which one was obtained from the lamp and the other from the light of the furnace. The latter was in regular

* A paper read before the American Society of Mechanical Engineers.

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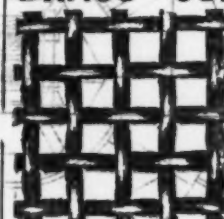
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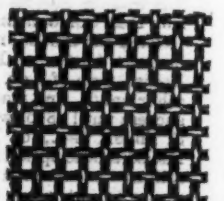
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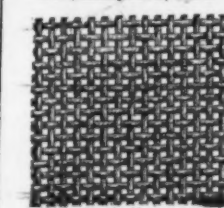
No. 4 Mesh, No. 12 Wire.



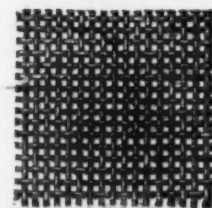
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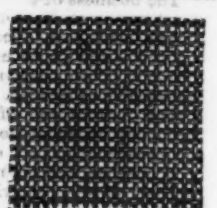
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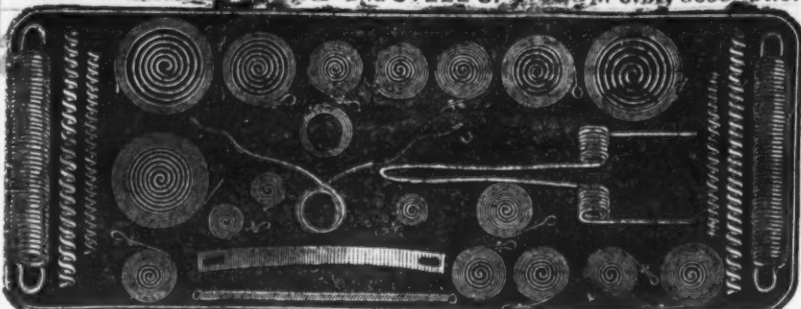
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ladle they now get about 87 1/2 per cent. cleaned soft iron ingots, and when making steel they get about 88 1/2 per cent. cleaned steel ingots, instead of 86 to 87 per cent. steel ingots before the introduction of the converter ladle. Besides these advantages of the converter ladle, the proprietor of the works informs me that after the introduction of the converter ladle at Bjornborg the density of the soft iron ingots has been increased by about 7.5 per cent. He also states that the upper ends and the surfaces of the ingots are much better now than before the introduction of the converter ladle. At Nykroppa Bessemer works the results already, before the introduction of the ladle, were very good, as they last year, from 94,355 centners of pig iron, produced there 83,729 centners (or 88.74 per cent.) cleaned ingots, and the manager of the works informs me that he was rather skeptical about the effect of the converter ladle. Nevertheless, it has been introduced at Nykroppa, with the results that they get now 89.58 per cent. cleaned ingots, of which 55 per cent. have been soft iron, with 0.15, or sometimes 0.2 per cent., of carbon, and the manager writes that his doubts about the advantages of the converter ladle have proved thoroughly wrong, especially as the iron ingots got with the converter ladle are much denser and much better at the upper ends than the iron ingots got before the introduction of the converter ladle. After a month or so (about) the Caspersen ladle also will be used at two other Swedish Bessemer works, viz., Sandviken and Forsbacka, where alterations of the works for this purpose are going on at present."

THE TERRENOIRE PROCESS OF SOLID STEEL CASTING.

The Terrenoire process of melting solid steel castings appears to be gaining ground in Europe. It has been adopted by the Steel Company of Scotland, and it is now stated that it has been introduced at the Bofors works, in Sweden, for the manufacture of guns, which upon trial in the Swedish navy have proved quite successful.

THE GARNIER PROCESS.

In a recent issue of *L'Ancre*, of St. Dizier, M. F. Laur describes the Garnier process for dephosphorizing pig, which is now being experimented with at the Aubin Works. A reverberatory furnace is provided with a fixed or movable hearth made of some basic material like lime, calcined dolomite, bauxite, &c. But before every operation this hearth proper is provided with a lining consisting of a layer of dry limestone or dolomite, and over this a thin layer of rich manganiferous ore and limestone. Upon the hearth thus prepared the charge is placed in the ordinary manner. The pig melts, while the limestone in the lining heats up gradually and the carbonic acid in it is driven out, which should not occur until fusion is effected, and for this reason the limestone is well rammed and covered with a dense layer of oxide of iron. The carbonic oxide passing through the bath is supposed to bring about the following: It is reduced by contact with the various elements in the pig, thus oxidizing them. The escape of the gases causes a boiling of the bath, and assists the oxidizing action of the air, while the burning of the carbonic oxide formed increases the temperature of the furnace. The escape of the carbonic acid from the hearth lining gradually destroys the cohesion of the latter, and particles of it rise to the surface of the bath, where they aid dephosphorization and bring about the formation of a basic cinder. As soon as the formation of carbonic acid has ceased, the temperature in the furnace is run up so that the whole is properly melted. From this description it will be noted that there is little that is new in the Garnier process, but as it has been repeatedly referred to in a mysterious way by technical journals without any statement of its characteristic features, the above summary of the process has been given.

Papers on Practical Founding.—XXVI.

BY EDWARD KIRK.

SOFT AND HARD BRUSHES.

Some founders use the common long dusting brush for brushing the dust from the pattern and follow-board, and removing the loose sand and blacking from the parting of the mold, but brushes are made on purpose for this use that are a great deal handier and cheaper than these common dusting brushes. In all the soft brushes that are made for use in foundries the full-length bristles are used, and they are put in the backs in such a way that one side of the brush can be used as well as the other, so that, however the brush may be picked up, it is always ready for use. For these soft brushes backs of various shapes are used. One of those that are extensively used is made 8 or 10 inches long and 1 1/2 or 2 inches wide. This back always seemed to me to make a very inconvenient brush. Another back that is extensively used is made 6 inches long and 2 1/2 inches wide, being rectangular. This makes a very convenient brush, for the back can be used for scraping off any lumps on the cope, or removing the sand from the tops of the flat gates. A soft brush should never be used too long, for the bristles get worn off so that they are too stiff, and do more harm than good when the parting is brushed off.

The hard brushes that are used in stove founding for brushing the patterns, to remove any dirt or blacking that may have hardened upon them, are made of no definite shape or size; in fact, there are no hard brushes made on purpose for foundry use, and the brushes generally employed are the common scrubbing brushes or horse brushes. Either of these answers the purpose equally well, but the horse brushes are usually made better than the scrubbing brushes, and they last a great deal longer.

STOVE MOLDERS' SHOVELS.

The shovels used for tempering and shoveling the sand in stove founding need not be very heavy or stiff, for there is but little strain upon them, the only thing to be shoveled being loose sand. A shovel called a molding shovel is made on purpose for use

in stove foundries and other foundries where light work is made. For these shovels the best of cast steel is used, and the shovel is made without any flanges on the sides; the best ones have no strap on the back or rivets through them, but are forged out of one piece, and the blade of the shovel is perfectly smooth up to the handle. These shovels are finished and polished in the best style, and the molders generally clean them off occasionally with a wooden wedge, and oil them every night, keeping them perfectly bright and free from rust until they are worn out.

STOVE MOLDERS' TOOLS.

The tools required by each stove molder consist of one shovel for tempering the sand and shoveling it into the flask and riddle; one of the rammers, Fig. 75, with an iron pane on one end for panning the sand to the sides and cross bars of the flask, and an iron butt on the other end for ramming the sand into the flask (some molders also use the other rammer, Fig. 76, for butting off the drag); two riddles, one fine one, a number six or eight; and one coarse one, a number four or five; one wooden strike-off, whose length varies according to the flask on which it is to be used; one set-off on which to set the cope when it is lifted off the drag; one pot for parting sand, and one for sponge water; a sponge or swab for applying water to the parts of the mold where it is desired; one small wooden mallet for rapping the pattern; one or two of the draw-hooks, Figs. 78 or 79, for drawing the patterns from the sand; two blacking bags, one for heavy and one for light blacking; one hard brush for brushing the pattern, and one soft brush for brushing the loose sand from the drag when making the parting; one pair of small hand bellows for blowing the loose sand from the pattern and mold; one clamping iron for clamping up, and one ladle and shank for pouring off. Besides these are the small tools used for finishing the mold, and the tools used for taking the castings from the sand. The former are: One small trowel for making the parting and cutting the fillets around the flat gates on the top side of the cope; a small double-ended tool for finishing the mold and dressing the flat gates; a small steel vent wire for venting the mold, and one or two of the draw-hooks, Figs. 78 or 79, for drawing the patterns from the sand. The tools used for taking the castings from the sand are one pair of small pincers for lifting the castings, and a small hammer for rapping the castings to jar the sand from them when they are lifted out of the mold with the pincers. Besides these tools are the sand, patterns, follow-boards, flasks, gate patterns, clamps, &c., which are permanent foundry fixtures in all foundries.

The cost of these tools to the molder depends upon how many of them he has to furnish, and the number he has to furnish depends a great deal upon where he works, for it differs in different foundries and in different localities. At Troy and Albany, and I believe generally through the East, each molder has to furnish or pay for his own shovel, rammer, riddle, strike-off, set-off, sponge, mallet, draw-hooks, blacking bags, brushes, hand bellows, clamping iron, ladle and shank, trowel, sticks, vent wire, pincers and hammer; while at Pittsburgh, and I believe generally through the West, he has only to furnish his own rammer, trowel, sticks, vent wire, draw-hooks, sponge, pincers and hammer, and even part of these are often furnished by the founder, for the draw-hooks are generally made by the foundry blacksmith and the castings for the rammers are always made in the foundry, and the iron borrowed until the casting is worn out and it is then returned to the scrap pile. There is, therefore, quite a difference between the cost of an Eastern and a Western molder's outfit, for while the former has to furnish \$10 or \$15 worth of tools, the latter is required to provide only \$2 or \$3 worth, and the rest are furnished by the founder and are considered foundry fixtures. There is certainly something wrong about this difference in the cost of the tools to the molders and somebody is imposed upon.

VENT.

When the molten iron comes in contact with the sand of which the mold is made, gas is instantly generated by the heat of the metal, and is formed so rapidly that, if no means were provided for its escape, it would throw the molten iron out at the gate with explosive violence. In cases where a way has been provided for this gas to escape from the surface of the mold, but not out of the flask, it will accumulate between the casting and bottom board after the iron has set, and, if any fire comes in contact with it, it will explode with a loud report, which will often jar the entire foundry building, causing the windows to rattle and showers of dust to fall from the cross-beams and rafters. This gas or vent, as it is called by the founders and molders, is a great deal more abundant and troublesome with some grades of sand than with others; yet it is probably not generated any more rapidly from one grade of sand than from another, and the apparent abundance of it in some sand is caused by the sand being closer and confining the vent, while in others that are more open the vent escapes unnoticed. With the same grade of sand, more vent will be generated on one day than another, and in one mold than in another. This is caused by the sand being rammed harder or worked wetter, which makes it pack closer and confines the vent more, and makes it more apparent and annoying to the molder. If the sand is too wet, or is of such a nature that it will pack so closely when rammed that the vent cannot escape, or if the mold is of such a shape that the vent cannot escape freely from its surface, then some way must be provided for its escape, or it will be impossible to make a perfect casting. The mold is, therefore, vented with a small pointed wire which is driven into the sand with the hand, forming small vent holes in the cope and drag, which extend almost to the pattern. When the mold is poured the vent escapes from its surface into these vent holes and out of the sand. The number of vent holes required to carry off the vent from the surface of the mold depends a great deal upon the nature of the sand, and the shape and size of the piece that is being molded. With some sand, when making a

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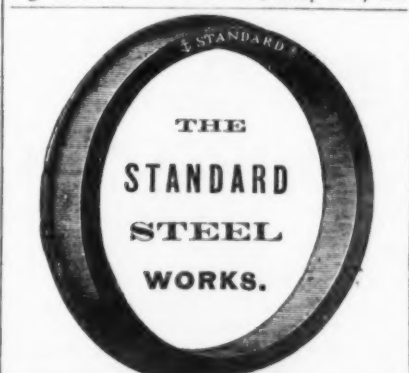
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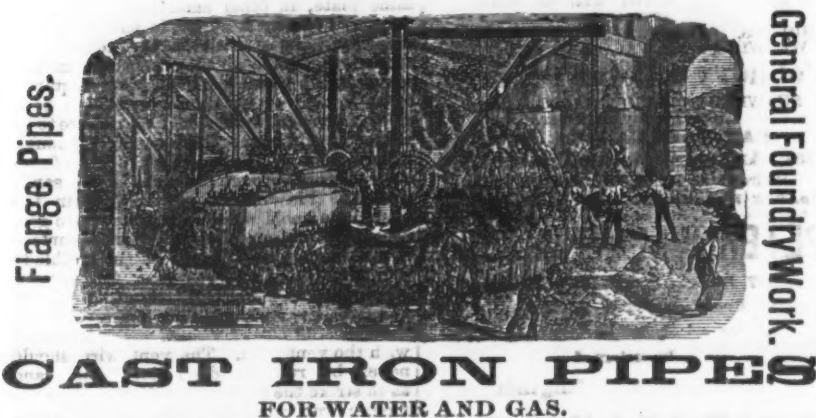
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to be of the very best workmanship and material; superior to the very best brands of English
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mold for a very light bottom oven plate, vent
holes must be put in 1 or 2 inches apart all
over the surface of the mold, both in the
cope and drag side; while, in molding the
same plate, in other sand it would only be
necessary to vent it a little in the center in
the drag, and a little in the center and
around the gates on the cope side. In the
same sand in which the oven plate required
to be vented every 1 or 2 inches on both
sides, a fire-back mold would not require to be
vented at all, because there would be enough
molten iron in the fire-back mold to force
the gases out through the pores of the sand,
while the thin sheet of molten iron in the
oven-plate mold would generate more gas,
because it was spread over a larger surface
of sand, and would be more susceptible to
the influence of the gas than the heavier
body of metal. For this reason the thinner
and lighter the piece is that is being molded
the more the sand should be perforated
with the vent wire. The vent wire should
never be run so deep into the sand
as to strike the pattern, for in that case the
molten iron would flow into the vent holes,
stopping them up and preventing the gas
from escaping, and more gas would be gen-
erated than if the mold had not been ven-
ted. Besides, the striking of the pat-
tern with the vent wire injures the pattern,
and the molten iron flowing into the vent
holes makes the casting very rough. The
vent wire, therefore, should never be run
nearer than within half an inch or an inch
of the pattern; this will make a smoother
casting and less fine scrap in the sand heap.
The drag side of a mold will not generate
any more gas for a light plate than the cope
side; yet the gas from the sand in the drag
has a far more injurious effect upon the
casting, on account of the tendency of gas
to rise. A mold for a flat plate with a large
continuous surface, such as an oven plate or
a bottom, requires to be vented more in the
drag than a top or a side which has not a
continuous surface; for, in the former, the
gas would rise and strike the plate, and if
there is not some way provided for it to
pass down and out, it would spoil the cast-
ing, while in the top or side mold the gas
would rise and pass around the casting and
out through sand in the cope. The venting
of the drag is useless wherever the vent can
get around the casting and out through the
cope.

The Sheffield Steel Trade.

A correspondent writes to the Newcastle
Chronicle respecting the gloomy outlook, as
follows: The change that is taking place
in the distribution of the manufacture of
steel in this country is more remarkable
than would at first sight be imagined. The
districts that border on the seaboard appear
to be acquiring, if they have not already
obtained, this special industry completely and
absolutely. Those districts that are inland and
possess no good canal accommodation, have
to reckon on heavy railway charges, and in
most cases the conveyance rates are so great
that the district's trade is very unfairly
handicapped, and is gradually broken up
and dissolved. There is no great steel cen-
ter that feels the disadvantage of its insular
position more acutely than Sheffield. There
is no good canal accommodation, and the
town is a long way from the coast. There
is a Sheffield canal, but in a moment of sig-
nalar indiscretion, arising from panic, the
shareholders some years ago sold their inter-
est to the Manchester, Sheffield and Lincoln-
shire Railway Company. Thus the only
waterway got into the hands of the railway
authorities, and after a combination had
been entered into by the various railway
companies whose lines run into the town,
the trade and commerce of the district be-
came very much at their mercy. The effect
of this railway monopoly has been to con-
siderably injure the steel trade, and to en-
tirely destroy some particular branches.
The most excessive rates have been paid for
carriage. The great firms have made strong
representations again and again to the com-
panies, but they have refused to bend. This
grievance has existed for years, and now the
Town Council have appointed a committee to
inquire into and report upon the charges made
by the railway companies for goods con-
veyed from Sheffield to Liverpool and Hull.
Some of the facts which have transpired in
connection with the steel trade of Sheffield
and district are certainly remarkable. While
Bessemer converters have been springing up
in Cleveland, Cumberland, South Wales and
Scotland during the past eight years, not a
single one has been built in Sheffield. In
1872 the Bessemer converters in the district
produced 425,000 tons of steel; in 1873
about the same quantity was produced; six
years after—that is, in 1879—the total was
510,000 tons; and this year, if these con-
verters now standing are to remain idle, the
rest will produce only 374,000 tons, while
their capacity is 600,000 tons a year. In
1872 the Bessemer converters in the Middles-
brough district turned out 34,000 tons of
steel; in 1873, 122,000; in 1879, 240,000
tons. In West Cumberland, in 1872, the
Bessemer steel production was 510,000 tons;
in 1873, 520,000, and in 1879, 672,000 tons.
In South Wales the amount produced in 1872
was 245,000 tons; in 1873, 250,000 tons, and
in 1879, 510,000 tons. This decline on the
part of Sheffield is noteworthy, but it is far
from all. In 1872 and 1873 the open hearth
process for the production of steel was con-
fined to Sheffield, Glasgow and a district in
Wales. In Sheffield there were 16, in Glas-
gow 6, and in Wales 8 furnaces going. But
in 1879 the comparison told a very dismal
tale, so far as the Sheffield district is con-
cerned. In 1872 Sheffield had 16 furnaces
producing 20,000 tons, and in 1879, 19 fur-
naces (though two were idle) turning out
22,000 tons. In Scotland, in 1872-3, there
were 6 furnaces producing 8000 tons, while
in 1879 there were 30 furnaces producing
40,000 tons of steel. In North Wales, in
1872-3, there were 8 furnaces turning out
10,000 tons, but now there are 50 furnaces
producing 56,000 tons of steel every year.
In 1872-3 there were no open-hearth fur-
naces in Middlesbrough and West Cumber-
land, but now there are 30, producing 40,000
tons of steel every year. This decline of
trade in Sheffield is attributed to the exces-
sive railway rates, which prevent fair com-
petition with other districts. There are at
present between 3000 and 4000 houses to be

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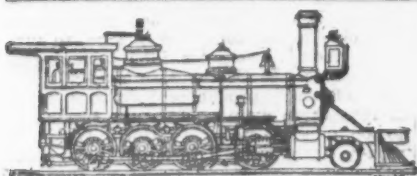
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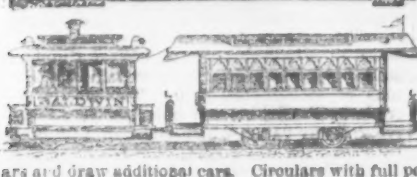
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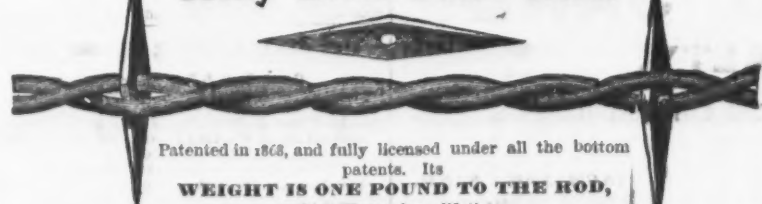
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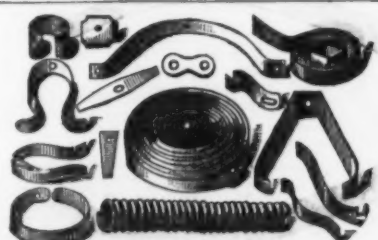
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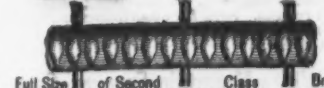
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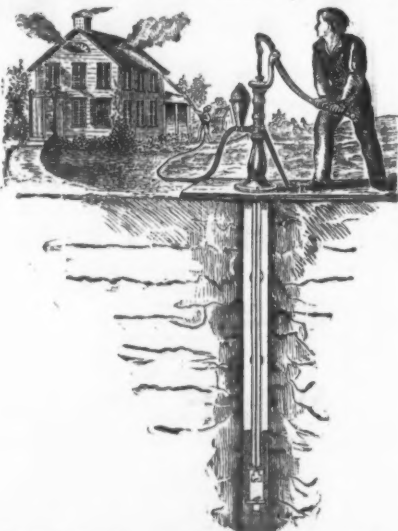


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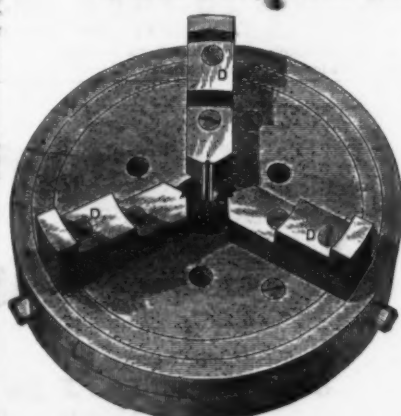


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The following analysis of the ore was made by Prof. Thos. M. Brown, of Philadelphia, Pa.:

ANALYSIS.	
Magn. Oxide of Iron.....	75.65
Protoxide of Iron.....	.83
Manganese Oxide.....	.09
Alumina.....	4.43
Lime.....	4.59
Magnesia.....	.97
Silica.....	14.89
Phosphoric Acid.....	.37
Sulphur.....	.48
Titanic acid.....	.27
Total.....	99.44

We propose to offer the above F. O. B. at Port Morris, N. Y., at \$3 per ton for 50 per cent. ore.

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Brewster, Putnam County, N. Y.

let in Sheffield, on account, it is commonly believed, of the great decline of the rail trade.

Improved Molding Machine for Foundry Purposes.

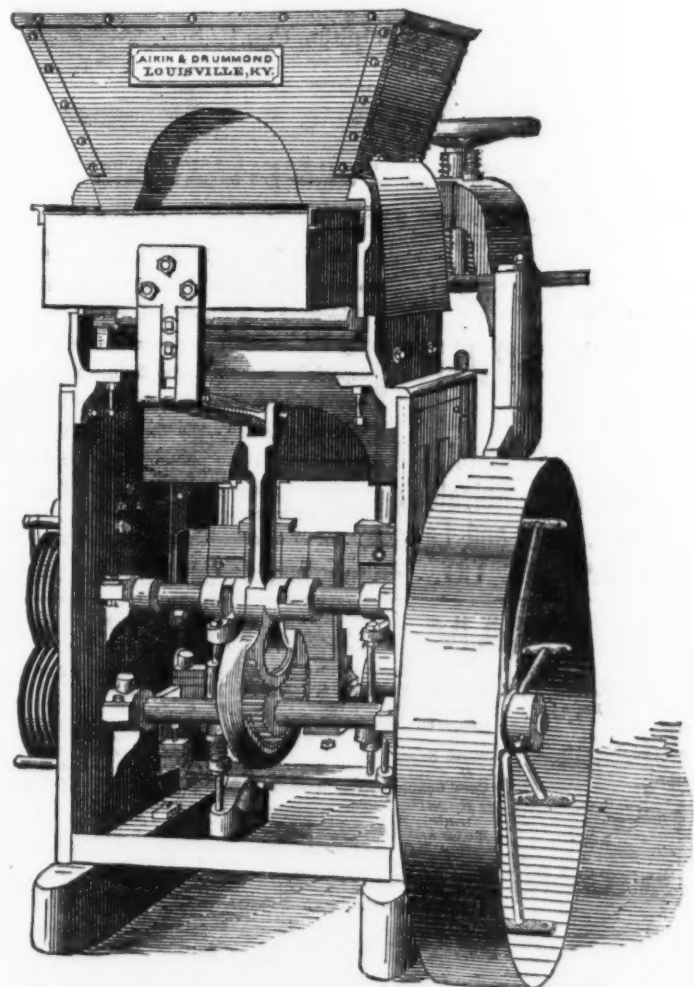
Several different kinds of molding machines for foundry purposes have been placed on the market at different times which have given good satisfaction, even though they have saved only the hand-ramping, and have still required the same skilled labor to operate them that would have been required to do the same work without their assistance. The gain from using such machines has been in the increased amount of product. Messrs. Aikin & Drummond, of Louisville, Ky., in a circular which has reached us, say that they are now offering something better. The accompanying illustration shows the front view of one of their machines, which is now being placed upon the market, an idea of which we shall attempt to give our readers by means of the following description: This machine, it is claimed, is, in fact, entitled to the name of a molding machine, because it is really a molder. Its operation is such that all it requires is the assistance of some person to feed it with sand, put on flasks and carry away the molds. Any good, active hand can manage it, there being no skilled labor required. It is stated that the machine when driven by power will make molds as fast as flasks can be put on, filled with sand and carried away. The ordinary snap, or iron flask, with or without bars, is employed. By examination of the engraving, it will be seen that the machine is made with a plunger and follower, the pattern being attached to an independent head

pipe fittings, cocks, valves and other plumbers' goods, thimble skeins, axle boxes, pump chambers, sash weights, and irons, stove doors, stove lids and all small castings of a similar character. We understand that these machines have been introduced in nearly all the manufacturing centers of the country, and also to a certain extent in Great Britain, Germany and other European countries. The machine was exhibited at the Paris Exposition of 1878, and was awarded the highest honors, together with a bronze medal.

The Transportation of Raw Materials.

In compliance with the request of a correspondent, the *Bulletin* presents some authentic information, collected in December last, relative to the cost of transportation of iron and its raw materials. The information is not of so comprehensive a character as it might be, but it embraces a very large part of Pennsylvania and Ohio, and covers much of the transportation of ore from Lake Superior and of pig iron to Chicago. It may be said that, although the railroad rates were those prevailing last December, yet if any change in them has been made it is quite likely to have been in the direction of lower charges, as rates are almost always higher in winter than in other seasons of the year. The rates given for transportation of iron ore from Marquette, however, refer to those prevailing on the lakes during last season.

1. In regard to the Pennsylvania Railroad: The rate on iron ore, cinder, scrap iron, pig iron, blooms and muck bars, from Philadelphia to Harrisburg, was \$1.27 per 2000 pounds, the distance being 110 miles; from Philadelphia to Johnstown, \$2.60 per



IMPROVED MOLDING MACHINE FOR FOUNDRY PURPOSES.

which is fitted to rest on the plunger head. Metal plates are fitted to surround the patterns and are attached to the follower head. The follower and pattern heads work independently of each other in the box, which serves as a guide and a gauge for the proper amount of sand to supply the reduction in compression. On this box adjustable pins are placed to hold the flasks. The sand hopper is furnished with a drawer having an independent bottom. When the drawer is pulled out it leaves the bottom at the edge of the flask, where it passes over and deposits the sand. It is then retracted, striking off the surplus sand and engaging the bottom at the proper place, carries all back into the hopper. A swinging binder plate is then brought over, which holds the flask in place to resist the pressure, while a revolution of the shaft, on which a series of cams are placed, raises the pattern head and follower simultaneously, forcing the patterns and sand into the flask. As the shaft continues its revolution the patterns are withdrawn from the mold, while the mold and sand are protected by the follower plate, which is afterward withdrawn, leaving the mold complete and ready to be carried away. We think by this description we have given our readers a general idea of the operation of these machines. A great merit, upon which the manufacturers lay special stress, is the simple construction employed and the fact that any active person can learn to operate a machine of this kind in a very few lessons. The machine, in fact, has the pattern set, compresses the sand and draws the patterns during one revolution without any rapping or sponging, thus forming a perfect mold and producing smooth, uniform castings. The machines are made of iron and steel in a neat and substantial manner. The working parts are fully protected from the sand. They require no more space in the foundry than the ordinary hand-bench, and as one machine will turn out at least three or four times the number of molds that can possibly be made on a bench, a large saving is gained in the actual floor space required to do a given amount of work. From this description it will be seen that the machines are more specially adapted to small castings—such, for example, as steam, gas and water

2000 pounds, the distance being 280 miles. These rates are by the carload, and average 1 1-6th cents per mile per ton of 2240 pounds.

The rate on coke from Everson to Harrisburg was \$2.32 per 2000 pounds, the distance being 235 miles; from Everson to Philadelphia it was \$2.97 per 2000 pounds, the distance being 345 miles. These rates are also by the carload, and average about 1 cent per mile per ton of 2240 pounds.

The rate on manufactured iron from Pittsburgh to Philadelphia was \$4 per 2000 pounds, the distance being 300 miles; from Pittsburgh to New York it was \$4.40 per 2000 pounds, the distance being 452 miles. These rates average 1 1-6 cents per mile per ton of 2240 pounds.

2. In regard to the freight on Lake Superior ores: The average lake freight on iron ore from Marquette, Michigan (the port of shipment near the mines), to Lake Erie ports during the past season, including season charters and single trip charters, was from \$2.50 to \$2.65 per 2240 pounds. The rail freight from Cleveland to Youngstown, 65 1/2 miles, was \$1 per 2240 pounds; from Cleveland to Pittsburgh, which is 131 miles by one line and 151 miles by another, it was \$2 per 2240 pounds. These rail freights average about 1 1/2 cents per mile per ton of 2240 pounds.

3. In regard to the freight on coke on Ohio railroads: From Conneville, Pa., to Cleveland, Ohio, the freight on coke was \$3.16 per 2240 pounds, the distance being 185 miles by one line and 208 miles by another. The average of these rates is about 1 3-5th cents per mile per ton of 2240 pounds.

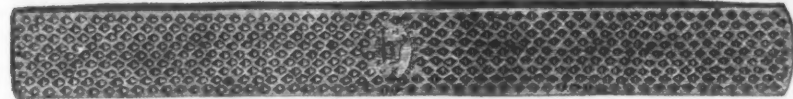
4. In regard to the freight on pig iron on Western railroads, partly in Ohio: From the Mahoning Valley, Ohio, to Chicago, Illinois, the rate was about \$2.80 per 2240 pounds, and the distance was about 385 miles, averaging about 3/4 of a cent per mile per ton of 2240 pounds.

The following is an analysis of Lake Superior copper, given by Ch. Mosler in his paper on the copper mines of Lake Superior:

Copper.....	99.661	Iron.....	0.007
Sulphur.....	0.003	Oxygen.....	0.002
Silver.....	0.003		
Total.....	100.000		

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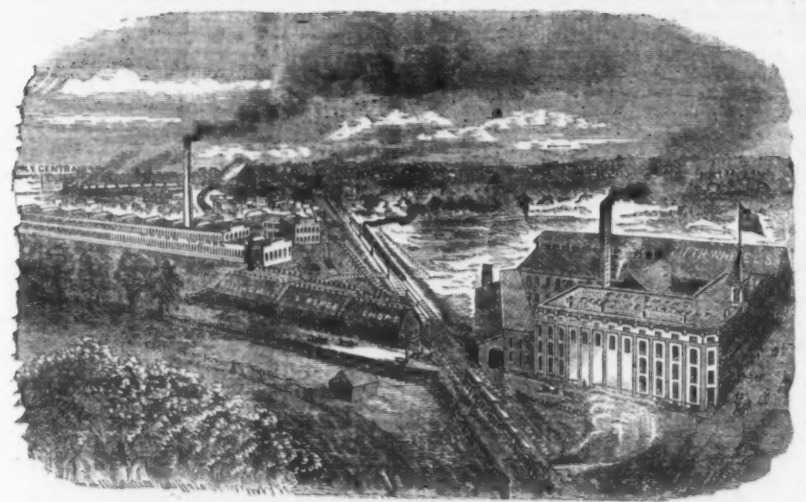
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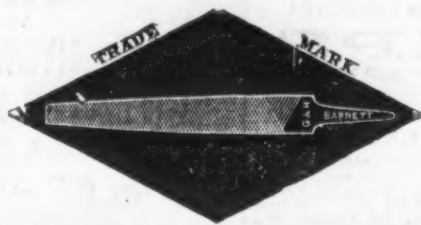
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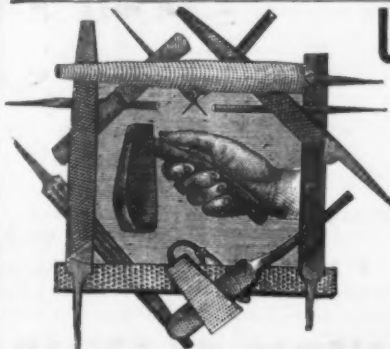
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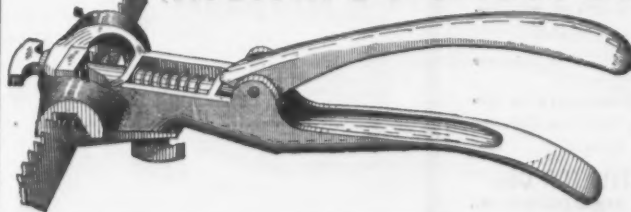
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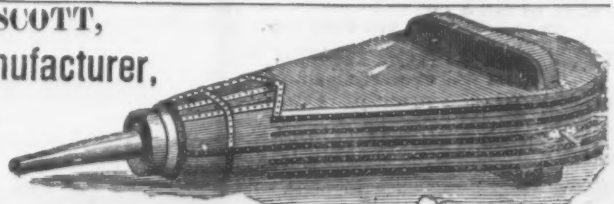
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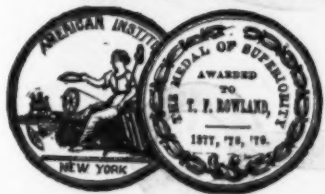
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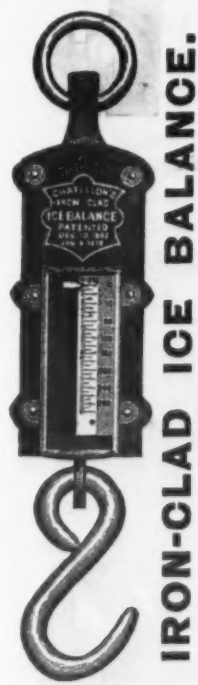
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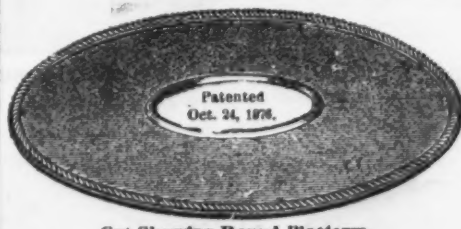


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IRON AND STEEL INSTITUTE OF GREAT BRITAIN.

THE MAY MEETING.—III.

Mr. John Bower, of St. Neots, presented the following paper, which will be read with interest, as giving the latest authoritative information on a subject which has received much attention:

ON THE PRESERVATION AND ORNAMENTATION OF IRON AND STEEL SURFACES.

Any process which has for its object the preservation of iron and steel from rust, and which will make these metals more applicable than they now are to the requirements of mankind, will be sure to meet with attention from members of the Iron and Steel Institute, and from all those who are either engaged in their production or application. It is, perhaps, not too much to say that with iron and steel rendered secure against corrosion and decay, they will be used to an infinitely greater extent than they now are. The whole realm of science has, therefore, been explored in the attempt to discover some method by which the formed article may be preserved, leaving its strength undiminished by the destructive action of rust. Paints, oils, varnishes, glazes, enamels, galvanizing, electro-depositing, and what is called "inocidizing," are among the many systems now in vogue to effect the preservation of iron and steel from the corrosive action of air and water.

The object of this paper is to show what may be done in protecting iron and steel from rust by forming upon their surfaces a film of magnetic oxide by an inexpensive process. It is no new thing to be told that magnetic oxide of iron is unaffected by exposure to the atmosphere; hence it is that so many people have endeavored to produce magnetic oxide paints from red oxide of iron or from natural magnetic oxide itself. Dr. Percy has pointed out that the reason why Russian iron is less affected by exposure than English sheet iron is because of a coating of magnetic oxide; but this was not known until Dr. Percy discovered it. That such a coating is produced is quite certain, but it is only an accident of manufacture.

To Prof. Barff is due the credit of being the first to deliberately undertake to coat iron and steel with magnetic oxide, produced designedly for the purpose of protecting their surfaces from rust. For my own part, whatever I may have done in the same direction, I feel it only right to publicly acknowledge that if the professor had not made his discovery, I greatly question whether I should have ever attempted anything of the kind.

It is curious how nearly we approach to discoveries without grasping them. Some 16 or 17 years ago I was making a series of experiments in the production of heating gases, one set of them being the decomposition of water by passing superheated steam through masses of red-hot iron. I observed that the iron became less and less active until it ceased to decompose at all, when, on examining it, I noticed that it was coated with a kind of enamel. It at once occurred to me, on seeing this, that the process in question might be used to obtain such a coating; but I found, after a few days' exposure of the iron to the atmosphere, that the coating shelled off, and I pursued the matter no further. I now know that if the iron had been new instead of rusty, I should have been the accidental author of the process which Prof. Barff discovered 10 years afterward. I only mention this to show how advisable it is to investigate the causes of unexpected effects. Out of such investigations, if we do not obtain the philosopher's stone, we may at least discover a very bright pebble.

Prof. Barff's process consists in subjecting iron and steel to the action of superheated steam, and when they are at a temperature sufficiently high, the iron then seizes the oxygen, and the product of the union is magnetic oxide. Here I feel bound to say that it was only on reading the description of the process that appeared in the *Times* in the early part of the year 1876, that it occurred to me that what the Professor could effect with water I ought to be able to effect with air, even though the oxygen in the one was in chemical, and in the other in mechanical combination. An experiment was accordingly made with cast iron, and it was successful; but repeated experiments made afterward turned out to be unsuccessful. Instead of getting magnetic oxide, I got sesqui-oxide in the most provoking and unaccountable manner. In the end, however, it was discovered that the quantity of air to be admitted into the closed retort, muffle or chamber must bear some proportion to the surface of the iron under treatment; for if an excess occurred, red oxide was sure to be formed. The main principle of action was to admit a few cubic feet of air into the chamber every half hour, during which time the iron had taken up the oxygen it contained, and a coating of magnetic oxide was formed, which increased in thickness by every successive operation. Effective as this was for cast iron, the cost of producing the coating was as great as by the Barff process, for both of them required that the chamber should be heated by the external application of heat, and this, with large chambers, was very expensive. It then occurred to my eldest son that we ought to be able to heat the articles by the internal application of heat, and to coat them at the same time by oxidizing and deoxidizing operations.

A long series of very costly experiments was thereupon commenced, extending over a couple of years, the result being that we now proceed as follows: A fire-brick chamber of any suitable dimensions is formed, in which the articles to be coated are placed, and connected with which is a set of gas producers. The gas, as produced, is led along passages, and is there mixed with air in a highly heated condition and consumed. The product of combustion—carbonic acid—and a small quantity of free air, enter the chamber, and when partially denuded of oxygen by their contact with the heated articles. They then pass over a fire-clay regenerator, which heats the air both for the

purpose of combustion and also for oxidizing. It will thus be seen that solid fuel of the cheapest kind may be used and converted into carbonic oxide, which, on being consumed as described with a sufficient quantity of air, leaves carbonic acid as the product; and it, together with highly heated air, passes into the chamber, making the articles red-hot, and in that condition they take up oxygen both from the carbonic acid and from the air. The effect of this is the production of a coating of magnetic oxide incorporated with the surface of the iron, but over it there is also formed film of sesqui-oxide. This part of the process occupies about half an hour, and is the oxidizing operation. The air valve is then shut off and carbonic oxide is let into the chamber, which reduces the upper coating of sesqui-oxide into magnetic oxide. This is the deoxidizing operation, and it occupies about a quarter of an hour. The whole process consequently consists in a series of oxidizing and deoxidizing operations, and the thickness of the coating on the metal depends upon the number of such operations. For indoor work, from three to four hours are sufficient; for outdoor, an hour or two longer is required.

One of the most interesting features of this process is that rusty iron, when subjected to the deoxidizing process, has its rust converted into a thoroughly protective coating. All that is necessary for this purpose is to remove the loose scale of rust from the iron before it is put into the furnace.

Not only, however, does this magnetic oxide coating process protect from rust, but the coating is of such a beautiful color as to render articles ready for the market directly they are out of the furnace and cooled. One remarkable feature of it is that there is no more cost (except in the labor of handling them) in treating 2240 articles, each weighing a pound, than there is in coating a cube of metal weighing a ton; and so penetrating is the process, that no matter how intricate the pattern may be, every crevice, which it would be almost impossible to get at with a paint brush, is as effectively coated as the plainest surface, as will be observed by examining the specimens exhibited in this room.

For art purposes the French-gray color with shades approaching to black might not always be suitable, but if it should be necessary to use paint on the iron so coated, there is the absolute certainty that it will remain on in the same way as it does on wood or stone, and thus iron may be used for constructive work in a thousand directions in which it has not, up to the present time, been possible, on account of its liability to rust, no matter what the coating used to protect it has been. I can give an instructive instance of this. A company in Paris had expended a very large sum over Dods' inocidizing process, which process consists in the depositing of successive layers of lead or silicate coatings on iron and steel, and then gilding, platinizing or bronzing them, and certainly the articles so treated were exceedingly pretty to look at; but the iron ultimately rebelled and threw off the coatings, so that the shareholders were in a fair way of losing all their capital, when it was suggested to the directors that if their compositions could be deposited direct upon magnetic oxide they would conquer the difficulty. They then applied to me for specimens of coated iron to experiment upon, and they were so satisfied with the result that the company purchased all my Continental patents, and now intend to carry on the combined processes on a large scale.

Prof. Barff's process is better than mine for wrought iron, and as I could see my way to construct a furnace that would combine my own process with the professor's, I have purchased the whole of his patents, wherever existing. The difference in the cost of working the two processes when worked separately is very great, the Barff process requiring, as it does, the external application of heat to the muffle or chamber, which, if of any considerable dimensions, is both difficult and very costly; but besides this a separate steam boiler is required, and a separate superheater, so that three distinct operations are necessary. By a newly constructed furnace, which combines both the Barff and my own systems, we can now coat by either at pleasure. The furnace for these combined operations I am not in a position to explain, as the patents are not yet completed.

Engineers and manufacturers appear far more ready to apply the processes on the Continent than, up to now, they have been here; but perhaps the reason has been that, so far as Prof. Barff's process is concerned, it has not yet been shown how large masses can be dealt with. I am able to demonstrate this, and to show also that for the treatment of underground pipes, wrought-iron sleepers, roofing and the like, the process can be readily applied, and at a cost much less than that of galvanizing, and it will at the same time be infinitely more durable; while for ornamental cast and wrought iron it is scarcely possible to imagine anything more artistic in color than some of the articles after they have been treated. I hope also to be able to color the magnetic oxide at a cheap rate, so that the field of operations for art work will be a very wide one. For ordinary hollow-ware for kitchen use, whether of cast or wrought iron, this process is admirably adapted; and though I am told that the gray or black color will probably be objectionable, yet I imagine, if it can be shown, as we can do, that the magnetic-oxide coating is more durable, more easily cleaned and much cheaper than even the common tinned article, a market will soon be created. Anyhow, the now combined processes are so far developed, and they have been so thoroughly examined by scientific and practical men, both here and on the Continent (whose testimony to the value and efficacy of them is voluminous), that they have passed from the region of theoretical investigation into that of practical application, and means will be immediately taken for establishing works in different centers of Great Britain for the purpose of coating iron and steel as a trade operation.

I am intending to apply the process to cast-iron gas and water pipes, and as the former have comparatively no pressure to

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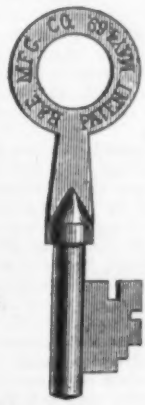
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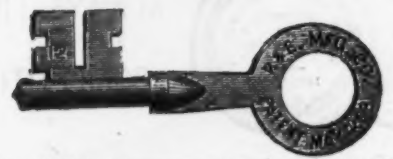
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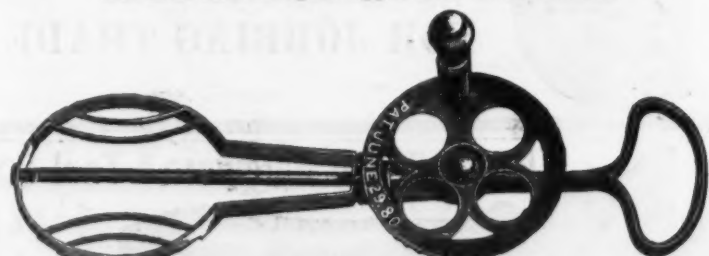
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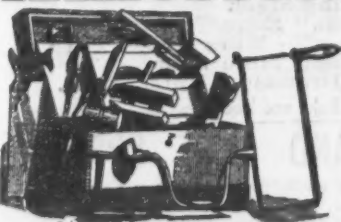
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bear, they may be made much lighter than they now are if rendered incorrodible; while for water it will be a great advantage to have both the main and service pipes rendered safe from rust, which not only discolors the water, but forms the nucleus of very troublesome deposits. I expect also to be able to supply wrought-iron or mild-steel pipes for the same purposes, especially for the interior towns of distant countries, where the first cost of the pipes is but small as compared with the cost of carriage. I have myself used gas and water pipes where the cost on arrival at their destination has been five times greater than their first cost in England. If, then, light wrought iron or steel pipes could be used, not weighing one-third of those made of cast iron, and rendered practically indestructible, what an enormous saving will be effected. Again, in the case of railway sleepers in iron and steel, which are now almost wholly used in Germany, the process is likely to prove of much advantage. So, at least, I am told by eminent engineers both in Belgium and in Germany, and if there, why not here?

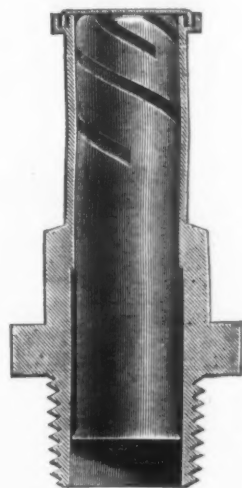
It will naturally be asked, what is the cost of the process? I cannot do better than answer this question by quoting from the report of Professor Flamache, the engineer in chief of the State railways in Belgium, who was sent over specially to report on the process by the Public Works Department of that country at the end of January last. His estimate of cost, after a very careful examination and testing of the process, was 7½ francs per 1000 kilos., or about three-fourths of a centime per kilo.; and by the surface, three-eighths of a centime per decimeter cube; but he adds: "This cost may be reduced, as, instead of one workman attending only to one furnace, he can attend to three or four; also by a better system of taking the articles in and out than existed in the experimental furnace I saw at St. Neots, and by having one gas producer only for several chambers." Of course, the above cost is exclusive of royalty. In the combined processes, which will be hereafter called the Bower-Barff process, the cost will be somewhat greater, but not much, and we shall be able to oxidize with carbonic acid and air or superheated steam, and to reduce rusty iron with carbonic oxide at pleasure.

Sir Joseph Whitworth, feeling much interest in Professor Barff's process, sent to him some steel to be oxidized, so that he might ascertain whether it did or did not lose in strength by the operation, and the result of Sir Joseph's testing was that there had been no alteration whatever. Theoretically, one would rather expect that iron and steel would be somewhat toughened, as the tendency of the process is to anneal, and would, no doubt, if continued long enough, render some classes of cast iron malleable.

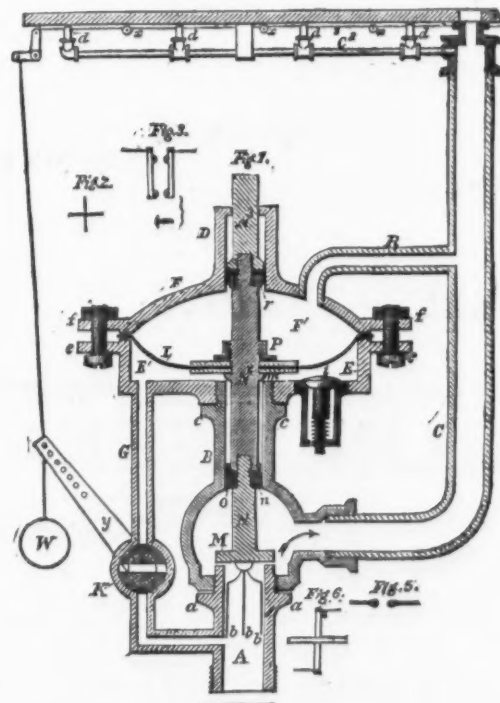
The Bishop Fire Extinguishing Apparatus.

Aside from the direct loss which fires in large factories, mills and warehouses always inflict, there is generally a very heavy one, never covered by insurance, growing out of

the source of water supply. It has the shoulders a, and in it the fins b (shown in Fig. 1 and in cross-section Fig. 2) move, to steady the valve M and its stem. The pipe B has the shoulders c, and its lower end is enlarged into a form nearly spherical, as shown, and is screwed to the pipe a. C is the main pipe in the building, into which the smaller pipes, on which the distributors are arranged, are inserted, and connects with the enlarged part of pipe B. The large cylindrical vessel E has the flange e, and is secured to the pipe B. It is connected to the pipe A by the pipe G, in which is the cock K, operated by the arm y, on which is the weight W. On the stem of the valve i is a light spiral spring of sufficient strength to keep it open when there is no water pressure upon it. The function of this valve is to let water out of the vessel E in case of leakage. A like valve may be arranged in the pipe C, above the point to which the water rises to



close the diaphragm or valve M. F is a dome-shaped piece of the same diameter as the vessel E. From the central part of the dome-shaped piece F the pipe D extends. L is an elastic diaphragm held between the vessel E and piece F, as shown, through which the stem passes and divides the chamber formed by vessel E and piece F into two parts or chambers. The valve M closes the pipe A, the end of the pipe being the valve seat. The stem N of the valve has a shoulder on which the collar n rests, and is packed in the pipe B by the packing o, its upper end being threaded. The stem N² is secured on the upper end of the stem N, and has its lower end packed, as shown. It also has the shoulder or enlargement m, on which a plate rests between which and another plate of the same size the diaphragm L is held by the nut P. Its upper end is threaded and has the collar r, which is packed in the pipe D. The stem N² is secured on to the upper end of stem N and projects above the pipe D. To its upper end a fire alarm may be attached. The pipe R connects the dome-shaped piece F with pipe C. The pipe C² is connected



enforced inactivity for weeks and months and a consequent inability to fill current and pending orders and contracts. The importance of an efficient and at the same time an automatic method of extinguishing fires, is becoming recognized and is now being supplied. It may be of interest, therefore, to call attention to a system which is being brought forward, and which lays claim to improvements in a number of important points. Like a system which has been before the public for some time, this new one, invented by N. P. Bishop, of Messrs. Foskett & Bishop, New Haven, Conn., depends upon the fusing of alloys of low melting point to effect a discharge of water upon the burning part of the building or store at the proper time. The following is a description of the Bishop extinguisher, the apparatus used and its operation:

One of the main objects held in view in designing the apparatus was to avoid keeping the water in the whole line of piping, which is so disposed along the ceiling of each floor of a building as to command every part of it. To have water in all the pipes at all times is attended with much inconvenience. In order to keep the branch pipes empty at ordinary times, and, besides, to insure a full delivery of water to them in case of fire, Mr. Bishop has devised the regulator shown in the accompanying illustration. A is a pipe which is connected to a pipe leading to a main in the street, or to

with pipe C, and on it, or on fittings connecting its parts, the distributors are arranged. The wire s is connected by joints x made by a bolt (shown in Fig. 3) of fusible metal, as alloys which melt at a low temperature are called, passing through holes made in the flattened ends of wire, as shown in Fig. 5. The connecting link (Fig. 3) consists of two strips or bars of metal, hinged at their lower ends by an iron bolt passing through holes in the bars, or in any other suitable way, the upper ends of the pieces being held together by a bolt of fusible metal passing through holes in the upper parts; or the upper parts may be soldered together. The bolt or solder being melted, the connecting wire is lengthened by the length of both pieces, and the connection is unbroken. In Fig. 6 a modification of the connecting link is shown, consisting of an upright bar soldered to a horizontal bar by fusible metal, which being melted, the connecting wire is lengthened the length of the bar, the connection being unbroken as before. The bar may be pivoted in the middle, and a pin of fusible metal may be inserted in the wall to keep it from turning.

The operation of the regulator is as follows: The water coming against the valve M opens it, and flows through pipes C and R into the chamber F, fills the chamber and rises in pipe C until the pressure on diaphragm closes the valve. When any one of

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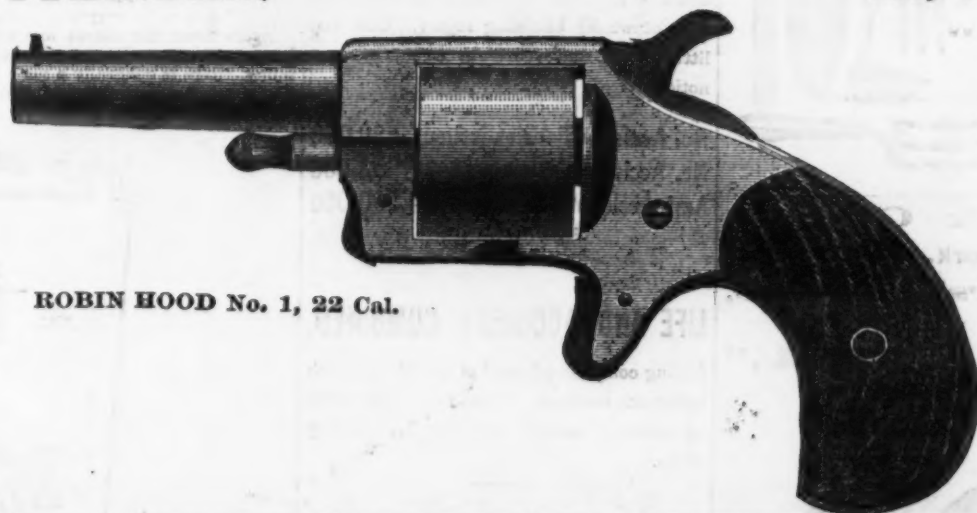
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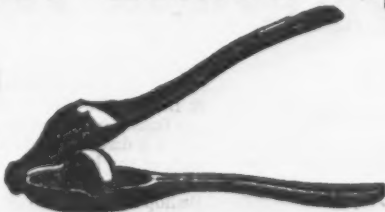
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Pat. Jan. 25, 1876. Pat. Jan. 26, 1879.
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B represents that part of the packing which, when in use, is in contact with the Piston rod. A the elastic back, which keeps the part B against the rod with sufficient pressure to be steam tight, and yet creates but little friction.
This Packing is made in lengths of about 30 feet, and of all sizes from 1/4 to 3 inches square.




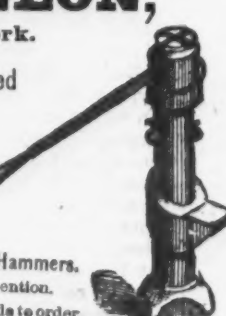

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the distributors shown in the accompanying illustration is liberated by heat in a manner to be described, or when any one of the fusible joints in the wires is melted, the arm Y descends and opens the cock K, and the water flows through the pipe G into chamber E, and creates a water pressure on the under side of the diaphragm equal to the pressure on its upper side, and the water flows through the pipe C in the same manner as though the devices for excluding the water from the building formed no part of the extinguisher.

The distributor mentioned in the above is a tube fitted loosely in the end of the conduit pipe. It has an enlargement on its lower end and suitable perforations in its upper end, which is closed. A circular piece of metal is soldered to the end of the conduit pipe with fusible metal to hold the distributor in its place and keep the water back until the metal is melted. In the conduit pipe there are shoulders which limit the motion of the distributor by means of the enlargement on its lower end. The operation of the distributor is as follows: As soon as the temperature is sufficient to melt the fusible metal—say 155 degrees—the water pressure in the conduit pipe forces the cap off and the distributor up above the end of the pipe. It rotates and the water is showered on the fire, the range of an ordinary distributor being given at 30 feet and its delivery at 30 gallons per minute under a water pressure of 50 pounds.

Steel Wire Network Fencing.
Messrs. Oliver Bros. & Phillips, of Pitts-
burgh, are manufacturing on a large scale and extensively introducing an important novelty in the form of a steel wire network

fence, which has important advantages where a light fence is wanted. Network fencing is not new, but steel is, we believe, a new material, and the process of manu-
facture now employed is so cheapened in




Fig. 1.

cost as to give this article a new value for consumers. The general shape of the mesh with the twist by which the wires are joined at the point of contact, is shown in Fig. 1. In the cut marked Fig. 2 is shown

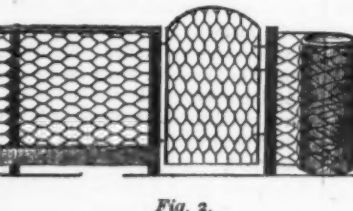


Fig. 2.

the network fence as put up with railing, and Fig 3 the end view of same. In Fig. 2 is shown the gates supplied for lawn fences, the gates weighing from 12 to 20 pounds. Figs. 4 and 5 show two forms of drive gates.



Fig. 3.

Fig. 4 shows a gate stiffened with wrought-iron pipe, and Fig. 5 one with wooden frame. These gates are remarkably cheap, ranging from \$4.50 for lawn gates to \$14 for 12-foot wide double drive gates. The netting ranges

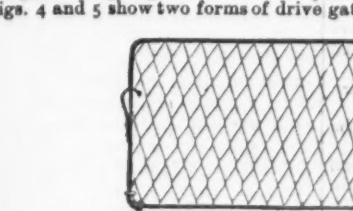


Fig. 4.

from \$1.47 for 34-inch wide per rod to \$2.35 per rod for 70 inches wide. Putting up this kind of fence is very simple, the complete outfit costing only \$2.50. The steel wire is coated with rust-proof paint.




Fig. 5.

SCIENTIFIC AND TECHNICAL.
In the *Annalen der Physik*, Herr Holtz describes some
CURIOUS PHENOMENA OF FLAMES.
For instance, two slender flames forced by un-
mixed gas issuing from fine apertures, unite fully if the burners are brought near each other and inclined a little; but on separating the burners, and again inclining the flames so as to meet, they only mix if the point of the one be brought to the foot of the other. The two bright luminous parts

behave as if mutually repellent. When the flames are pressed together, so as to broaden, there is always a well-defined dark space between. The phenomena are perhaps (the author thinks) electric. Again, when two thin flames are crossed at a certain angle (25 to 30 degrees), and about the middle, a peculiar red-glowing tube forms at the lower part of the oblique flame disk, being composed of carbon particles whirling circularly and spirally. The particles on one side whirl in an opposite direction to those on the other.

A faint sound is emitted by tin when it is bent. It has always been believed that this "CRY OF TIN," as it has been called after the German, is peculiar to that metal. Mr. J. C. Douglas, however, finds that it is not really singular, and, being due to the crystalline structure of the tin, can be imitated with other metals of a crystalline formation. The reason why it is not generally observed with cast zinc or cast iron is that these metals break off short before they can be bent sufficiently to yield the sounds; while rolled zinc has its crystalline structure so far destroyed by the mill that it is not capable of uttering the cry when bent. If, however, a piece of rolled zinc be heated for a few minutes to a temperature somewhat below its melting point, the metal becomes much less tough, and its fracture decidedly crystalline. In this condition it emits on being bent a cry like tin, but fainter. Cast zinc cannot be bent so readily, but if it be pinched between the teeth or with pliers, it emits the sound distinctly. The practical deduction from these experiments of Mr. Douglas is that, as appears to be proved, the peculiar "cry" in question is due to the crystalline character of the metal, it may either alone, or in conjunction with the microphone, become an indicator of the crystalline texture of metal beams and of their fitness for a certain class of work.

In a recent issue of the *Railroad Gazette* attention is called to the importance of
BALANCING CAR WHEELS,
and the following example is given to show the effect which follows if car wheels are out of balance: On the Philadelphia, Wilmington and Baltimore Railroad, some time ago, one of the cars was a frequent subject of complaint on account of its irregular motion or "rough riding." The springs were examined, and, we believe, replaced with others; at any rate no fault could be found with them, and no improvement resulted from their change. Finally the wheels were taken out and new ones made by a different maker were put under, when, to the surprise of everyone, the motion of the car from being very rough became very smooth. This led to an investigation by Mr. Lungren, the master car-builder of that line, when it was discovered that the old wheels were very much out of balance, whereas the new ones were in an almost perfect state of equilibrium. This led him to make the following experiment: He constructed a rectangular wooden frame large enough to take a pair of wheels inside of it. On each side he put a set-screw with a point like a lathe center, which was screwed into the center of the angle so that the latter could revolve freely. The pair of wheels and axle to be tested were placed in this frame and held by the set-screws as described. The frame was then placed on rollers, about 2 or 2 1/2 inches in diameter, which rested on a fixed frame. A rope was then wound around the axle, and a number of men then took hold of this and pulled it rapidly, as in spinning a top, so as to cause the wheels and axle to revolve rapidly. When the whole rope was thus unwound and the wheels were revolving with a speed of about 150 revolutions per minute, it was found that the degree of unbalance— to coin a word—was indicated by the horizontal oscillations of the frame on the rollers. If the wheels are in equilibrium, the frame remains stationary when the former are revolving. There can be very little doubt that unbalanced wheels have very much to do with the smoothness of the motion of cars, and probably if car-builders

would repeat the experiments described above the fact would be impressed upon their minds as it could not be in any other way. It seems to be quite as important to test the equilibrium of cast-iron wheels as it

is to "pair" them, or measure their diameters, so as to get wheels of the same size in the same axle. The *Railroad Gazette* suggests that the experiment could be made more satisfactorily if the movable frame, instead of resting horizontally on the rollers, was suspended vertically, so as to swing freely, like a pendulum. The rope could be carried over a pulley attached to the floor immediately under the wheels, and when the former was unwound the frame could swing with perfect freedom.

In the New York Legislature the bill relating to underground telegraph wires has passed the Senate.

The Mexican Congress has given the President, for eight months, full powers to contract for the construction of railroads.

The Iron Age

AND
Metallurgical Review.

New York, Thursday, June 2, 1881.

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burgh Hardware and Metal Prices.

The statement of the Director of the Mint as to the amount of coin and bullion in the country, not only reveals a wonderful increase in our possessions in manu of the precious metals, but is most suggestive as to the future financial history of the country. According to this statement, the total gold circulation of the United States, including bullion in the Treasury, amounted at the commencement of May to \$250,000,000, of which about \$264,000,000 was held as Treasury and national bank reserves, and \$256,000,000 was in actual circulation. There has been a total gain of gold coin and bullion to the country since July, 1879, of \$234,000,000, of which \$35,000,000 was added to the Treasury, \$59,000,000 to the banks and

\$140,000,000 to the active circulation. The total amount of gold in the country makes a fair showing compared with the principal countries of Europe, being exceeded by only two. The amount estimated to be in England in 1880 was \$596,000,000, of which \$428,000,000 was in actual circulation; and France, with \$927,000,000 of gold, had a circulation of about \$816,000,000. The larger proportion of gold in active circulation in the latter two countries the director attributes in part to the fact that their coinage consists almost exclusively of denominations of less value than \$5. The largest English gold coin is the sovereign, equivalent to \$4.86½ of our money, while in France, out of a total coinage during the last 77 years of \$1,743,288,000 of gold, nearly 99 per cent. was in pieces of less than \$5.

The importance of these facts, in anticipation of the future, is in their tendency to transfer some of the importance which certain countries of Europe have had as monetary centers to this country. This gain in coin is one of the most significant features of the times, and, when it is coupled with the success of refunding, it indicates that one of the great drawbacks to our industrial advance—high interest—is disappearing.

The Theory of the Basic Process.

As the evidence on the basic process is accumulating, study reveals new phases of the theoretical questions involved, and suggests better means for avoiding difficulties and attaining regularly successful operation. The rapidity with which developments are following one another is almost bewildering, and much that was accepted at one period has since been modified or changed. A striking instance is a series of articles written during the course of two years by Prof. Von Ehrenwerth, of Leoben, to whom, it will be remembered, much credit is due in connection with the basic process. In his second volume, recently printed, we find some curious instances of the changes which the opinions of a close observer have undergone, and it is somewhat difficult to sum up the final conclusions reached. It is becoming more apparent, as knowledge in the basic process accumulates, that the nature of the compound in the shape of which phosphorus enters the cinder is highly important. Stead and Poursel have made some direct experiments to settle the question. Ehrenwerth reaches his conclusions by theoretical deductions based upon the analysis of cinder submitted. All agree that phosphorus is eliminated in the form of phosphate of iron, but there are differences of opinion on the question whether this compound remains in the cinder as such, or whether it is transformed to phosphate of lime. It is well known that the phosphate of iron is easily reduced, while the other compound is a much more stable one. The aim ought, therefore, to be to bring about its formation so that during the final additions little or no phosphorus is driven back into the metal. Examination of cinders obtained during the working at Eston and at Hoerde have proved the presence of both compounds in varying quantities, and a reference to the analysis of the metal shows that in some cases phosphorus is reintroduced in a considerable proportion through the agency of the final additions, while in others this does not take place to any appreciable extent. This demonstrates the possibility of preventing injurious final reactions and suggests the means for doing it. The nature of the compound into which phosphorus enters is dependent upon the saturation of the silica by the bases. A phosphate of lime, magnesia, &c., will take place only after a sub-silicate has been formed and an excess of lime remains. While in the Hoerde cinder, silica ranges from 9.50 to 13.81 per cent. and lime from 52 to 60 per cent., silica varies from 15 to 21 per cent. and lime from 34 to 41 per cent. In certain kinds of Eston cinder. The quantity of lime to be added to secure this result must, of course, depend upon the quality of the pig, and its contents in phosphorus, silicon and manganese. Prof. Ehrenwerth has made a series of calculations, from which he deduces the fact that a reduction might take place in the amount added at Hoerde, where the best results have been obtained. He does not, however, urge such a reduction on the score of prudence. Taking into account waste, temperature, additions of lime, &c., Herr Ehrenwerth reaches the conclusion that the most favorable composition of the pig to be treated by the basic process would be—phosphorus, 1.5 to 2 per cent. and silicon 0.7 to 0.4 per cent.

Manganese plays an important part, and its functions are beginning to be better understood now than formerly. It seems that it is eliminated steadily during the entire process, but that the reduction of the quantity in the metal does not by any means take place as rapidly as it does in the ordinary acid Bessemer process; and it is a fact of much significance that, starting with pig high in manganese, the steel will retain a portion of it to the very last. The presence of manganese toward the end of the blow is a safeguard against the inconveniences attending the so-called "after-blow," and as phosphorus oxidizes more rapidly during that period than manganese, a comparatively small quantity of manganese at its beginning will suffice. There can be no doubt that the peculiar feature of the Bessemer pig, containing, as it does, quite a considerable quantity of manganese (1.5 to 2.5 per cent.), has much to do with the rapid suc-

cess of the basic process at the German works. From 1 to 2 per cent. of manganese in the pig is, therefore, very favorable, but it is by no means indispensable, as some metallurgists appear to believe. It is only necessary, with pig low in manganese, to keep the silicon low, have a high percentage of carbon, and to add a sufficient quantity of basic additions in a well-heated condition.

A conviction seems to be gaining ground among metallurgists, based upon facts, that it may be possible to carry phosphorus down to a low limit without the after-blow. It is known that quite a considerable, though varying, quantity of that obnoxious element is carried off during the period when carbon is being eliminated. At Koenigsbuehne, Germany, pig containing 1.3 per cent. of phosphorus was blown, the steel obtained without an after-blow holding 0.15 carbon and 0.055 phosphorus, and being of good quality. Opinions as to the best specification for pig, under the circumstances, differ. Some hold that iron low in silicon, but high in phosphorus, manganese and carbon, ought to be used, while others, among them Herr Helmholtz, insist that the proper composition to adopt, with a view to shortening the after-blow, would be low phosphorus and high silicon. Results obtained at Ougrée, Belgium, seem to confirm the views of the former party. The matter is one of great importance, as the after-blow, which is considered characteristic of the basic process, has often been alluded to as one of its weak points. Experience has not borne out this view, but still it cannot be denied that it has its inconveniences.

As for the progress of the process during the last few months, little that is new or decisive can be added. It should be stated, however, that some rumors have been current recently as to the quality of the steel made by the Croust works, it being stated that the rails showed irregularity, both as regards the percentage of phosphorus and of carbon. Even if it should prove true—and as yet no sufficiently reliable data are at hand to warrant us in accepting these statements without question—the fact would not affect the issues in this country. To the iron trade at large it makes but little difference whether the existing Bessemer mills will make their rails by the acid or by the basic process. To manufacturers of wrought iron the question is whether mild steel made by the basic process will supplant the product of the puddling furnace, and that question is not at all affected.

English Railroad Freight Rates.

We have heard so much about the advantage possessed by English ironmasters over those of this country in the matter of short transportation and consequent low freights, that we read with some surprise the account of the meetings of the Parliamentary Committee on Railway Rates and the testimony given by ironmasters summoned before it. Shippers, it appears, complain not only of excessive charges, but of most unjust discriminations—i. e., special rates to favored shippers. From the testimony of witnesses examined, it appears that the evils complained of by ironmasters and ironmongers are the same in kind, and relatively as serious in degree, as those which the Anti-Monopoly League talk about in the ships and tracts with which this country is flooded. Mr. Alfred Hickman, of South Staffordshire, complained that in consequence of "the excessive rates charged for the carriage of raw materials" by the railroads, the iron business of South Staffordshire is "rapidly becoming defunct." These rates, it seems, are the result of a compact between the London and Northwestern and the Great Western roads for the maintenance of charges. The witnesses generally tell doleful stories of discriminations, overcharges, local rates and disproportionate charges for short distances, and of the unwillingness of the companies to give the public access to their schedules, so that shippers can know what the authorized rates really are. In a country as small as England there would not seem to be much chance for the crushing out of an industry by excessive charges on railway freights, but small feet are pinched as tight by small shoes as are large feet by shoes of larger size, and the wail of the English shippers seems to be as loud as those heard at way stations and intermediate points in this country. If our English neighbors have to confess, however, that they are relatively no better off than we are in the matter of transportation charges, the only one of the many advantages claimed by them over us, which our ironmasters have freely conceded, disappears. Knowing how specific are the Parliamentary enactments for the regulation of railway charges, we have always supposed that English shippers of freights at least knew the rates and could make their calculations accordingly; but if, as we judge from the testimony of the witnesses before the Parliamentary Committee, even this is denied them, we are forced to the conclusion that railway management is pretty much the same on both sides of the ocean, and that even Parliamentary enactments are not a panacea for all the ills which shippers of freights are heir to.

Secretary Windom has scored another success in the conversion of the 55 into 3½, the entire amount of \$250,000,000 and a little more being presented for conversion by the

day named. The original programme has been adhered to, and all that were not mailed in time have been refused, as well as other offers. The month of May, 1881, will be memorable in the history of finance, not only of this country, but of the world. Between \$500,000,000 and \$600,000,000 of 5 and 6 per cent. bonds have been converted in this one month into 3½ per cents—not by any forced process, but at the desire of the holders. April, 1879, when \$240,000,000 of 4s were sold, sinks into insignificance.

The Lake Superior Ore Market.

The iron-ore trade of the West presents some points of interest that are worthy of note. In the first place, the situation in regard to sales differs materially from that of the past two or three years. Last year, for example, the furnacemen could scarcely get their orders in early enough. The ore offered was eagerly taken, and the furnacemen who had been late in sending in their orders danced attendance on the agent of the producer and accepted the smallest favors with thankfulness. This is not the condition this year. With the exception of the Bessemer pig-iron manufacturers, the furnacemen are holding back—not so much, it should be stated, for the purpose of bearing the ore market, as to see what the course of the pig-iron market will be. Much of the lake ore is sold—perhaps three-fifths—but this three-fifths is largely Bessemer ore. Chicago has bought more largely of ore this year than ever before, the purchases for that market aggregating 650,000 tons. On the other hand, the furnaces of the Mahoning and Shenango valleys and Pittsburgh, outside of those making Bessemer, have bought but little. The ore men argue from this that these furnaces have a short supply and must soon be in the market. But is this true?

There is no doubt that these furnaces must be in the market sooner or later for some Lake ore, but not as much as the agents hope, nor as much, proportionately, as in former years. It is a fact that the "other sources of supply" are being worked. Not to mention the foreign ore that will be imported, there have already been over 80,000 tons of Virginia ore sold in Pittsburgh for this year's delivery. Lawrence County, Pa., will mine 75,000 tons this year; Clarion and Armstrong counties 60,000 tons, and from Huntington and Center counties will come 50,000 tons. All of this ore will be used in Pittsburgh and the Mahoning and Shenango valleys, and will cut down the demand for Lake ores proportionately. That is, 265,000 tons of ore not from Lake Superior will be used in these localities, where 50,000 to 75,000 tons will cover what was used last year. This ore is not as rich as the average Lake ore, but it is not transported so far, and as it is low in impurities, its use will probably extend so long as the present prices of ore rule.

We think the situation can be summed up that for the best ores there will be a good demand, and for the second grade the demand will turn on the condition of the iron market.

Steamboat Inspection.

Serious charges come from Washington respecting alleged abuses in the administration of the steamboat inspection laws. It is charged that the Board of Supervising Inspectors, subject to the authority of the Inspector General, are influenced by "a ring," so that they intentionally neglect to perform their duties—at least, so far as relate to the circular of the Treasury Department issued last July, instructing them to make daily reports upon the steamers visited by them, according to sections 4406 and 4407 of the Revised Statutes.

To the general public this is an alarming statement, following so quickly upon the reports of the shocking catastrophe at London, Ontario, by which the Seawanhaka disaster is so vividly brought to remembrance. The allegations referred to are precise and unequivocal. "The ring," it is said, rebels against the circular of July requiring daily reports, a majority of the ten Supervising Inspectors having passed a resolution requesting that it shall be withdrawn. These gentlemen, so far from insisting that the local inspectors shall comply with the law, have the assurance to affirm, in their communication to the Secretary of the Treasury, that "if the Supervising Inspectors attended to their duties as provided in the law, they would have no time to make the reports called for." In the light of these facts, the resignation of the former Supervising Inspector in New York, on account of the pressure of private interests (notwithstanding the receipt of a government salary of \$5000 per annum), acquires a new interest, and it is more than intimated that every one of the protesting inspectors in like manner has outside engagements demanding a large share of his time. According to the Washington correspondent of the New York Journal of Commerce, the present incumbent of the New York office "has steadily and persistently refused to pay any attention to the circular" of last July. Surely here is a subject calling for official inquiry.

We have no faith in the value of the steamboat inspection service, and believe that it would be incomparably better to hold owners strictly responsible, leaving them nothing in the way of certificates showing a perfunctory compliance with the

requirements of the law to shelter themselves behind in case of disaster to life or limb. But if the government undertakes the work of protecting the traveling public, the steamboat inspection service should be something more than a farce. Our only safety now is in an intelligent and impartial enforcement of the law, and if the gentlemen selected object to earning their liberal salaries by a strict and disinterested attention to duty, they should be promptly displaced to make room for better men. Evidently the present incumbents consider their offices sinecures, and object to any order which makes attention to duty imperative. Better nothing than this.

Private Brands of Tin Plate.

Although we have in the past given considerable attention to the subject of private brands, the topic is far from exhausted. The evil continues in full force, much to the distress of honest tinners and greatly to the prejudice of honorable dealers. The publication of a letter from our special English correspondent, which appeared in a recent issue, and in which the statement is made that a single manufacturer—said, too, to be of good reputation—employs over 200 private brands for the purpose of encouraging dealers to deceive consumers, brings up the subject afresh. Hardly a day passes that we do not receive letters from our subscribers complaining of the present quality of tin plate, and not a few of the consumers who thus write us inquire if something cannot be done to stay the course of deterioration which is now manifested so strongly. Very few of the writers seem to comprehend that the remedy must begin where the trouble originated. Consumers have been calling for cheap tin. Now they are getting it. If they do not like it, they must order something else. They have offered themselves as willing subjects for humbugging. If they are tired of the fun they must change the game. When requiring a good quality of charcoal plate, worth, say \$10, they have been willing to accept something branded with a name they never before heard, in place of that with which they were acquainted, simply because it was offered at \$9.50, and was marked "equal" in the dealer's circular. In a few instances the plates thus obtained have been passable in quality. In more they have been unfit for the purpose intended. If complaint was made the dealer would say—"Yes, we have discovered we were deceived in that lot of tin, and we very much regret your annoyance. We have now in stock another brand which we think will please you, but the price is \$9.75." Thereupon the dealer ships another lot of the same tin, conveniently disguised under a new name, and charges the consumer 25 cents per box extra for bleeding him the second time. And so the game has been going on for years. The consumer, finally disgusted with the play as conducted by Mr. A., has turned to Mr. B., who, with many expressions of sympathy for the man who has been so misled by the "rascally" A., has proceeded to do the same thing over again. In the background there are Messrs. C., D., E., and so on to the end of the list. Each is glad in turn to take the poor consumer and do for him whenever his turn comes. Meanwhile, the obliging manufacturer on the other side has 200 private brands by which to encourage and sustain this kind of business. So the consumer finds himself in a maze—entangled in a net, as it were—and turn which way he will there seems no way out. Let it never be forgotten that manufacturers make and dealers keep in stock that for which there is a demand. It would be a ruinous policy for them to attempt to manage their business in any other way. This is a principle in commercial affairs which no one will dispute. It follows, therefore, that the system of private brands has been sufficiently patronized by consumers in this country to make it a profitable feature of business; hence its existence. This brings us back to our original proposition, that the consumer is primarily responsible for the present unsatisfactory condition of affairs. Just so long as he continues to use tin under private brands, just so long will the market be supplied with it. Just so long as private brands are profitable to the manufacturer, just so long will he continue to add to his list, swelling the 200 brands to 2000 if occasion requires. On the other hand, whenever honest brands are demanded; whenever consumers refuse to be humbugged any more and insist upon quality; whenever they assert themselves upon this question, recording their position in unequivocal terms, all this sort of business will pass away, and a new and better order of things will be instituted. Private brands will not be maintained any longer than they are demanded by the consumers. Trickery will give way to honest practices whenever the latter will pay the best.

In laying the blame upon the head of the consumer, we do not exculpate the manufacturer nor the dealer. While the consumer invited the deception in the first place by persistently demanding cheaper goods, and thus opened the way for the line of evils which has followed, the manufacturer must bear the full measure of blame for acceding to the demand and resorting to trickery to save his profits. His course is inexcusable. We believe that all business men intend to be honest, and that they are drawn into disreputable practices unwittingly and by force of circumstances, rather than from

preference. Hence our assertion that the private brands will cease as soon as something else is demanded by consumers. Dealers are middlemen and can have but little influence in the matter of the goods they handle. Where they have sold private brands in an open and honest manner, they have done nothing to be ashamed of. They simply supplied a legitimate demand, but when they have become parties to the fraud, which has been the case in such instances as cited above, their position is even worse than that of the manufacturer. Dealers on this side of the water necessarily occupy the position of confidential advisers to consumers, who, in turn, repose their trust in them, advising with them as to quality, kind, &c., for specified purposes. To designedly and systematically betray this trust cannot be condemned in too severe terms. It is hardly a feature of trade. It is a species of crime.

Our readers know the ins and outs of private brands. We have painted the picture in a way not to be misunderstood. We have placed blame where blame belongs, and we have indicated the measure of responsibility attaching to the several parties implicated. What are they going to do about it? Of the evils, all are convinced; of the remedy some may be in doubt, but of the desirability of a change there is no question. The matter is in the hands of consumers. Let them rise to the occasion. *The Iron Age* alone cannot change the existing state of affairs, however much it might be our desire to do so. Action must be taken in other quarters, and therefore we again refer the whole matter to the consideration of the parties most interested.

Wages in Window Glass Works.

Signs of trouble begin to appear at Pittsburgh between the manufacturers of window glass and their skilled workmen. The wages in this business are arranged for what is technically known as the "fire." In the summer the factories are idle and the "fire" extends from the 1st of September to the 1st of June. The window glass manufacturers, at a convention held in Chicago last January, decided on the usual stoppage of three months. At this convention the following was adopted:

Resolved, That all furnaces shall go out of blast on the 1st day of June, 1881. Any manufacturer, however, may continue to run till the 1st of July, provided he can do so at the reduction of not less than 30 per cent. on all his skilled labor, and no resumption of work shall be made until a reduction of 30 per cent., at least, be made in the wages of all blowers, tenders, flatteners, cutters and other workmen whose wages have been advanced.

The Pittsburgh manufacturers, at a meeting held on the 24th ult., endorsed this action, and it now seems as though a struggle was imminent. The claim of the manufacturers for a reduction in wages is based upon the low price of glass. Stocks, it is claimed, are twice as large as they were at this time last year, and those who have empty warehouses have sold their glass at a price that would not cover the cost of manufacture. It is also claimed that the importation of foreign glass has been very large and at ruinously low rates.

Both manufacturers and workmen are thoroughly organized, and have shown in the past that they both had good staying qualities in a fight. At the same time they have shown, since a long struggle some years since, a spirit of fairness and compromise on both sides. It is certainly desirable that the dispute should be settled amicably, and that the working classes of the country should understand that the wages which are now paid cannot be continued.

American and English Pumps.

A firm of pump manufacturers at Wolverhampton have secured access to the columns of a very respectable and widely-circulated London trade newspaper, to publish some statements concerning American pumps which are so completely at variance with the facts as to suggest willful misrepresentation. This firm say over their signature (which is certainly courageous, if not commendable):

Now, the pumps made in America are so constructed that when once out of order they cannot be readily repaired, and generally have to be replaced with new ones. On the other hand, a very special feature in our manufactures is the great facility for repairs or taking up wear. When our goods are once introduced, the experience of the last few years clearly shows we have nothing to fear. On the contrary, our colonial trade is steadily increasing. The only real difficulties we have to contend with are, therefore, nothing more or less than the very strong prejudice existing in favor of American goods, and the decided reluctance of colonial buyers to make a change. This once overcome, the rest is comparatively easy.

Now, if there is one class of manufactures in which we excel it is in pump making, and it is a peculiarity of American pumps that until the barrels are worn out they can be easily and cheaply repaired. There are but few in common use in which an occasional renewal of leathers will not prolong their usefulness almost indefinitely, and the only parts which can break with ordinary rough usage are replaceable at very small cost. The various standard American patterns of iron pumps are practically perfect, and, all things considered, are the cheapest, most durable and most efficient pumps made. They are made on the system of interchangeability of parts, and it is seldom that one is found so completely worn out that it is not cheaper to repair it than to get a new one, small as the cost of a new pump may be. If these facts are unknown to English pump makers, they would do well to acquaint

themselves with American pump-making practice. But we do not hesitate to express the belief that they will find it impossible to make pumps after any one of the standard American patterns which will not need to weigh from five to fifty pounds more in order to have the same strength. As American pumps have been an important article of export for many years, it will need something more than straight-away lying on the part of English pump makers to protect themselves against the competition they find so uncomfortable. They have the same trouble which the agricultural implement makers experience. They must make their goods heavy to secure adequate strength, and American patterns cannot be closely imitated for this reason. To tell them that we have better iron here than they have in England, and that we can make our castings stronger with fewer pounds of metal, is to excite derision—but it is the fact, nevertheless, and English manufacturers who have come here on tours of inspection have found it out.

The Scales at Pittsburgh.

As the result of four conferences between committees of the iron manufacturers of Pittsburgh and the Amalgamated Association, a conclusion has been reached as to scales of wages for the next year. The only material change in the scales, as at first presented, is in the bar mill scale. As stated in a previous editorial (May 19th), there was a provision in this scale for the payment for crop ends and for box faggots and old rail piles. The workmen alleged that this was necessary to protect themselves against mills shearing long ends and using them for purposes other than scrapping, thus securing material at no cost for labor. In one mill, it is alleged, long ends were ordered to be made and subsequently used in a branch of manufacturing conducted by the firm. The practice, however, was stopped when the workmen "kicked." The workmen did not claim that this practice existed in all mills, but only in two or three. On the other hand, the manufacturers could not see the justice of making a regulation by which 36 mills should suffer, because of a complaint against 3 mills in a matter which has been corrected and which is susceptible of being corrected in any mill at any time it should be necessary. They state that the rule in question would tend to demoralize the business, inasmuch as it would be offering a premium for carelessness in puddling, heating and rolling. A puddler might boil the raw iron poorly, a heater might heat it badly, or a roller might roll it without due care, because, though the product be fit only for the scrap heap, it must be paid for under the "crop end" clause and another clause which virtually extends that clause beyond 12-inch crops. This question was the chief cause of dissension. After a thorough discussion it was settled by the withdrawing of the crop end, faggot and old rail pile provisions, and commuting the claim by increasing the scale for bar mill rolling from 65¢ on a 2½¢ card to 70¢.

According to the London correspondent of the *New York Tribune*, the recent election at Preston for Member of Parliament was of more than usual importance. The election resulted in the return of a Conservative by double the former majority, the cause assigned being the sympathy of numerous workmen with the protectionist views of the Tory candidate. While it would be folly to assert that a return to protection is among the possibilities of the near future in England, there is no doubt of the fact that the free-trade sentiment is weakening. The correspondent above referred to telegraphs as follows: "The signs of discontent under 'free-trade legislation increase, large 'classes of workmen manifesting a disposition to retaliate against the foreign 'tariffs. The question excites fresh attention in consequence of the coming revision 'of the French commercial treaties. It is 'reported to be the intention of the French 'to add 15 per cent. to the duties on manufactures, but no responsible statesman yet 'believes it possible to form a protectionist 'party here." The British workman sees the benefit his fellow secures on this side of the water as the result of a protective tariff, and though he may not know precisely what to do, in a blind way he is showing that he is not satisfied with the status and desires change. This feeling is destined to play an important part in English politics, but it is not clear how, in the case of Great Britain, protection could be made protective. An analysis of her imports, especially from countries against which the temptation to "retaliate" is strongest, shows that she cannot accomplish much by high duties beyond handicapping her manufacturers and hardening consumers. What she wants is not protection for her own markets, but freedom in foreign markets, and the latter cannot be secured by "retaliatory" legislation.

Three projects for tunneling New York city for railway purposes are frequently mentioned, viz.: The New York Underground Railway Company, the Beach Pneumatic, or Broadway Underground Railway Company, and, more recently, the Central Tunnel Company. The first claims to have the right of way secured, and to have complied with all legal requirements, but for some reason capitalists do not take hold of the stock, and so the work is not put under

contract. The second company named is believed to have no real existence, though an act now before the Legislature is designed to revive powers which are extinct—or, rather, as the lawyers say, have never been acquired. The corporation last named was formed soon after the passage of the Hayes bill last session, and was intended to form a connection with the Hudson River Tunnel at Washington Square, but, owing to a subsequent change of plan, the route now spoken of is Fourth avenue. The position appears to be just this—that while the New York Underground Company is gathering its forces, preparatory to its great undertaking, other corporations are struggling for precedence. The underground railroad projects are not yet wholly above ground or otherwise.

A suit has just been instituted at Pittsburgh that will, if it is prosecuted to the end, give an interpretation of the law of conspiracy as applicable to the Amalgamated Iron Association and its methods. The suit is by a puddler against the mill committee. The puddler had been a member of the Amalgamated Association and withdrew, but was refused a card. After this he obtained work at several places for a time. Finally he was given a furnace at the Fort Pitt Works of Graff, Bennett & Co., and had begun work, when the committee waited upon the proprietors of the mill and notified them that unless Rogen (the plaintiff) was at once discharged, the men employed in the puddling department would quit work in a body. To prevent a stoppage of the mill the demand was complied with, and Rogen was discharged, or left to save the proprietors trouble, as it is alleged. This point is immaterial, as the leaving or discharge was in accordance with the threat of the committee. The committee claim that the origin of the whole trouble was the promotion of Rogen, a new hand, over several helpers who were entitled to precedence by reason of long service, or, in other words, that the firm had no right to hire whom they pleased. We hope this case will be pressed to a conclusion, in order that we may learn just what the law is in its application to iron works.

Assistant Secretary French, of the Treasury Department, accompanied by Mr. James, chief of the Customs Division, spent two days in Pittsburgh last week examining the various processes of iron and steel making. They professed themselves very much surprised at the character and extent of the iron interest of this city, and as the questions relating to iron are among the most important as well as most difficult of those connected with the tariff law, it was desirable that these gentlemen, who have the decision of so many tariff questions, should have some idea of the different forms and modes of iron manufacture from witnessing the operations.

The New York, Lake Erie and Western Railroad Company have acquired control of the franchise of the Chicago and Atlantic Railway Company, extending from Marion, Ohio, on the New York, Pennsylvania and Ohio Railway, to Chicago, and will at once proceed to complete the entire line to Chicago. By an arrangement made with the New York, Pennsylvania and Ohio Railway Company, the Erie Railway Company will control the entire line from New York to Chicago, thus securing an outlet to Chicago entirely independent of any of the existing companies.

WASHINGTON NOTES.

(From Our Own Correspondent.)

WASHINGTON, D. C., June 1, 1881.

The recent decision of the iron car truck channels question in favor of the manufacturers meets with universal approbation among the employers interested in this important industry and the thousands of men who, through their enterprise, thus find useful and profitable employment.

It is not always agreeable to make comparisons, but it may not be improper to say that the new regime in the Treasury Department will take a more lively interest in the affairs of our manufacturers than was the case under the late administration. This is particularly noticeable in the office of the Assistant Secretary, who has been somewhat severely criticised as leaning too much to the side of the importers and foreign manufacturers. The Assistant Secretary, as stated in a former letter, has lately shown more particular interest in our home iron and steel industries than he received credit for a few months ago, and accepted an invitation from the manufacturers of Pittsburgh to visit their city, which he did a week ago, as he stated to the correspondent of *The Iron Age*, in order that he might get acquainted with some of the leading manufacturers, familiarize himself with the extent and character of the iron and steel industries of the United States and better understand what they require. This the Assistant Secretary, Judge French, accomplished to his entire satisfaction.

A few evenings since, calling at the delightful home of the Secretary of the Treasury, from politics the subject of conversation turned upon economic questions and among them protection and free trade. The Secretary observed with great emphasis: "I believe in American industries as against the whole outside world, and whatever can be done to foster and stimulate them I believe it the duty of the government to do."

The secretary said that the subject of fostering home industries as directly applying to the protection and elevation of labor, was beginning to be understood by the masses in quite a different light from the teachings of a large class of people during the past two decades. The old doctrine

advocated by some of buying in the cheapest market, he thought was pretty well exploded on economic grounds, not to speak of national self-interest. In regard to prices he observed that values were relatively affected by demand and supply, and applied as well to the remuneration of capital as labor. The fact of any article being rated at a higher price on account of protection does not solely inure to the benefit of the manufacturer as claimed, but is shared in by the laboring masses by giving them employment, and at higher wages. It was very clearly shown in the recent hearing that labor which brought \$1.75 in England brought about \$3.50 in the United States, and without a fostering care of home interests the laborers thus employed would be without work at all or would be compelled to work at the same ruinous rates to enable the manufacturers to keep their works in operation. The controlling influence which iron exerts upon all other industries renders the question still more serious, and the secretary takes the view of these questions which benefits the largest number of people.

In the course of conversation your correspondent remarking that his views would be received with great satisfaction by the laboring classes in general, and by their fellow workman in the iron and steel works of the country, particularly if presented in full, he replied that he would rather speak through decisions, as words were of little value as compared with acts. The cotton-tie question, recently made, affirming the position of the department before, could not have been determined differently, in view of the judicial decisions and rulings which had gone out on the subject, but on any question presenting an original issue it is safe to say the action of the department will be in favor of home rather than foreign enterprise.

AMERICAN INSTITUTE OF MINING ENGINEERS.

MEETING AT STAUNTON, VA.

As the train from New York, which bore a small party of members of the American Institute of Mining Engineers to the South, approached Virginia, the number of ladies and gentlemen who were found to be traveling toward Staunton increased, and when that beautiful town was reached nearly 100 had gathered. Among these were many whose labors as investigators and practical engineers have become familiar to all interested in the trades they represent.

On Monday, May 30th, the members and many citizens of Staunton assembled at the Staunton Opera House for

The First Session.

After a brief introduction by the Mayor of Staunton, the Hon. A. H. H. Stuart, a venerable and eloquent gentleman delivered a well worded and hearty address of welcome, which was listened to with close attention and frequent applause.

Mr. William Metcalf, of Pittsburgh, then read

THE PRESIDENT'S ADDRESS.

which, with unimportant omissions, was as follows: *Gentlemen*.—In accordance with that custom which requires the president to open the first meeting of each year with an address, I invite your attention to-day to a consideration of Force. With Mass, Motion and Force the engineer has to deal. Mass falls properly into the province of the mining engineer; Motion must mainly attract the attention of the mechanical engineer, while Force must be the chief study of the engineer pure and simple, or, shall we say, of the engineer of mathematics. This division does not include the chemist, but we leave abundant scope for him in the study of the calculus of endless variations in his element. These classes of engineers have their direct relation to various social forces; for themselves, the end and aim of their hopes and ambition is glory. For the capitalist, their chief use is to help him to make more money. For the toiler, their use is to enable him to make the most wages with the least labor. The chemist is allowed to meekly bow his back and submit when things do not come out just exactly as they are wanted to come.

There is another great social feature, however, which, although perhaps the least sought after, yet is really the greatest good of all, and that is the inevitable raising of the general level of mankind by the pursuit of all of the aims of the above-named classes. The navy who digs with pick and shovel has a certain amount of intelligence; provide him with a steam excavator, a good tramway, a locomotive and dump cars, and the simple contact with these devices of a higher intelligence than his own will act as an educator upon him in spite of himself. The man who delves in the earth with pick and crowbar, and who gropes down and up rude ladders in going to and from his work, will acquire some skill in his art and have little to interest him in life. Provide him with a good power drill, good ventilation in his mine, pumps to keep away the water, and good elevators to hoist the product of his labor and himself from the mine, and you invest him with an atmosphere of intelligence which must add to his mental growth; the product of his labor is greatly increased; he is paid more wages for his better skill, is made happier in every way, and yields to his employer more profit. The quarryman, with a sledge, some wedges and a drill, will hark back the face of the earth, bore a small hole, burn much powder and blow a few stones into the air, at the imminent risk of his own life and the lives of all about him. The engineer steps in and provides him with proper tools, directs him to bore tunnels and do a vast amount of unaccountable work; finally he places his charges, connects his wires and calls off his men, and when all is ready, at a touch of his hand a whole cliff trembles and crumbles into a loose mass of material, ready to be carted away. The men who have done the work have been educated. The old fashioned machinist, who could do everything with a hammer and chisel and a gearless foot lathe, from the fitting of a joint to the cutting of a screw thread, was a very skillful man, but he bore no comparison to the average ma-

chinist of to-day, who understands every machine in the shop, can read his drawings, make his own calculations for his work, and make things to come together as they should. Nor did the old-fashioned man ever dream of earning such wages as are paid willingly to-day. The old-style steel melter, who used coke holes and spent the whole day toiling over the fire or in the ash pit, earned enormous wages and exhausted his energies; full of dirt, ashes and weariness he went from his work to the grog shop, filled himself with beer and slept away his misery. The same man to-day, handling one of Dr. Siemens' beautiful gas furnaces, has had to turn his mind to the ingenious mechanism he is to manage; he works in a clean, light and pure atmosphere, gets a thorough sweating three times a day and a good rest between heats, and is on the average an upright, intelligent, thrifty man; so that while many who have paid large royalties to Dr. Siemens and are willing to pay him more for his great money saving inventions, regard him only as a great engineer, history will give him high rank as a benefactor of mankind. The puddler of to-day must toil at his rabble and worry at his fire for ten or eleven hours a day; his work is hot, dirty and exhausting, and he is about the most troublesome factor in the iron business, and no one can wonder at this who takes the trouble to watch his operations. As soon as the seething and bubbling in the minds of men, caused by the tremendous strides and changes now in progress in steel and iron processes, shall have settled down into an era of steadiness, and it comes to be well understood that in spite of steel the world will continue to need some wrought iron, mechanical puddling will receive that attention which it deserves, and then the puddler will be converted into a happier and more manageable man.

Similar instances might be given almost without number, but enough has been said to show that, without aiming for such a result, engineers are rapidly raising the intelligence of those who work under them.

Leaving the social questions which must grow up under the new conditions, such as trades unionism, monopolies, &c., to those whose duty it is to guard the rights and liberties of the people, it is proper now to ask what the engineer has to do for himself! It will probably be admitted by all who have experience in such matters, that the most really intelligent men are they who will do the most work and give the least trouble; provided that those who are in charge of them are possessed of ordinary common sense and are above the average in intelligence. It is clear, then, that it is the duty of the engineer to keep himself well advanced in intelligence beyond those whom he is educating after him. He must be educated and he must educate himself. The question of how to best educate an engineer is one of absorbing interest, which has engaged the attention of this Institute and the American Society of Civil Engineers through some very able and interesting discussions.

My own conviction is decidedly in favor of mathematics, carried through all of the higher branches, even though it should seem too much for the brain, as in the case of the student who being called upon for a solution of the familiar problem in calculus known as the bee's cell, told his professor that he had worked at it all night and had only succeeded in making a hornet's nest of his head. It should involve the study of all of the higher branches, including the application of the calculus to the problems of mechanics, the laws of force, and even through the celestial mechanics; although the youthful mind might be utterly incapable of grasping the subject, it should be driven to investigate the operation of the mathematical applications so far, at least, as to see that the solutions of the equations are correct. Such an education in the stern and rigid logic of proof, is to the engineer what the study of the classics is to a literary man. It forms a solid and enduring foundation, and the engineer so educated may forget all about his calculus and mechanics, but he can never lose the habit of looking straight at every question, looking for the reason of things and demanding proof. A mind so equipped is ready for development in any specialty it may be called upon to undertake. Then comes the engineer's self-education, and that he can get everywhere. There is a way to grub in the ground with a pick and shovel, and there is a way to handle even these simple tools so as to raise their right use almost to the rank of a fine art. Careful observations and intelligent questions are the greatest helps and the greatest necessities in self-education, and they should be accompanied by the conviction that every man knows something which ought to be brought out of him.

And now we have to consider the greatest of engineering forces, this Institute. One of my predecessors declared that the chief object of this Institute was to "have a good time," and that decision has been in force ever since. Another decided, upon a grave occasion, that this Institute "has no opinions, and never can have an opinion on any subject," and that ruling was sustained unanimously. Having, then, a "good object" and "no opinions," we are free and untrammelled—an absolute democracy. Having no home we go where we please, and we are, therefore, tramps. Embracing in our membership all of the classes of engineers before referred to, in addition we include the geologist, upon whom we depend for correct information as to where to look for what we want; the mineralogist, who tells us what it is that we want after we get there; and the chemist, who tells us what we have after we have found it.

Nor must we omit one more class—the revered professor, who, although he discharged us all years ago, still remains in our midst, watching us with paternal pride and cheering us with his benison. With such a variety of potentials in our ranks we roam the country in search of information, prepared to digest all that we can get.

Facts are what we want—the facts that make up the forces of our lives, our hopes, our successes and our failures. Every member has some fact to give, and it is the accumulation of these facts that makes up

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This was put upon the market by a concern known as Geo. W. Spurr & Co., of Greenfield, Mass., last year. We at once commenced suit against Geo. W. Spurr & Co., and our suit, begun in October last, is still pending. Almost immediately thereafter, Geo. W. Spurr & Co. began to be transformed into something else, and in February, 1881, a concern known as the Rogers & Spurr Manufacturing Co., claiming to be a corporation organized under the laws of Massachusetts, began at the same place the same piracy of our Trade-Marks. To protect ourselves and the public, we were obliged to bring a second suit against this apparently new concern. This we promptly did, and both our suits are now pending in the United States Circuit Court of Massachusetts, Messrs. Aiken & Son, of Greenfield, Mass., and Chamberlin & White, of Hartford, being our attorneys.

2nd. W. ROGERS, ★

This trade-mark has been put upon the market by Simpson, Hall, Miller & Co., and we commenced suit against them last year, and our action is still pending in the Superior Court of this State.

As the delays of the law are numerous, and great damage is likely to be done to our trade before we can, by legal proceedings against the manufacturers, put a stop to these most apparent infringements of our long-established and well-known Trade-Marks, we take this way of cautioning you and all other dealers and purchasers of plated wares against buying any of the goods offered in the market bearing either of said trade-marks. We also notify you that we shall hold you personally responsible to us for damages sustained by the sale of any goods by you bearing either of said marks, and that we shall take all legal measures possible to promptly and effectually stop all infringements of our well-known Trade-Marks.

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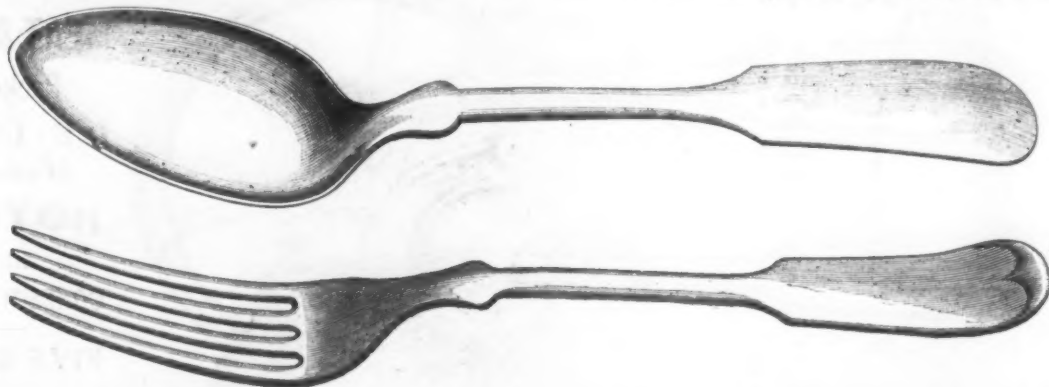
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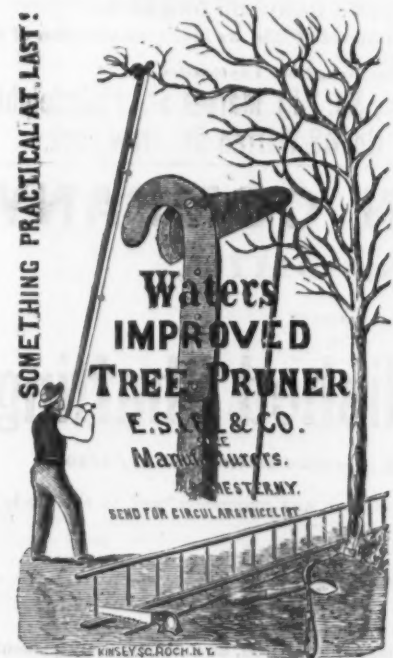
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the sum of the good of this Institute. We cannot all be poets, as some of us are: we cannot all be master builders, as some of our members have proved themselves; nor can we all write long and analytical discussions of our themes, as some of us have done so ably; but we can all be hod carriers and bring in our little facts. And the facts that we, the hod carriers, bring up to our master builders are the intellectual bricks that go to make our Transactions what they are, the best encyclopedia of the living and advancing engineering practice of our day.

One thing in this connection is of great importance, perhaps of the very greatest importance, and that is to learn to read the signs correctly. The signs are all about us, showing themselves in every way, and the secret of the successful man lies in their right reading. Who, in his student days, has not toiled for long hours over a problem and come out all wrong, and then labored many more hours to find at last that he would have been all right at first if he had not read some miserable sign awry? And who does not know of instances of wide-awake men who always see the signs and who run upon disaster after disaster, simply because they do not take time to read them.

Prof. T. Egleston next read a paper by Mr. J. B. Mackintosh, of Hoboken, N. J., on the "Electrolytic Determination of Copper and the Formation and Composition of So-called Allotropic Copper." In examining copper alloys by the Luckow electrolytic method, Mr. Mackintosh found that it gave results showing positive errors averaging about 1 per cent. The excess in weight was found to be due to the fact that so-called allotropic copper was found similar in physical properties to that described by Schützenberger. The latter, however, found 5 to 10 per cent. of suboxide of copper in this "allotropic copper," while Mr. Mackintosh found carbon and hydrogen, the relation between which was important. Synthetic experiments indicate the presence also of nitrogen. The practical results is that in nitric acid solution the presence of organic matter makes the electrolytic method by Luckow inaccurate. Prof. Egleston made some additional remarks on the importance of the paper and the effect of impurities upon the electrical and other uses of copper.

Mr. Sharples, of Boston, stated that in Dr. Gibb's laboratory the electrolytic method was tested by him a year before Luckow had published it, and they found that a little quantity of nitric acid did no harm, and could be counteracted by ammonia. He described the method now used by him in copper analyses, which he thought bid fair to become the standard method. Prof. Frazer and Mr. R. W. Raymond joined in the discussion, and the latter made an effort to obtain some facts as to the impurities affecting the conductivity for electricity of copper and the possible conclusion which might be drawn therefrom in relation to iron wire.

Prof. Frazer closed the session by reading a paper on a new geological map of Chester County, Pa.

The Excursions of the Society of Mechanical Engineers.

At the Hartford meeting of the Society of Mechanical Engineers, Friday, May 6, was spent in visiting the various shops and places of interest in town and the immediate vicinity. The day was dull and the earlier portion rainy, which made the work of getting about somewhat difficult.

Early in the forenoon one party took a train for Willimantic to visit the somewhat famous one-story thread mills, which were found to be of the most admirable character, both in construction and arrangement.

Those who did not wish to go out of town were divided into two parties, and were started in opposite directions to go through the various shops and places of interest. The second party leaving the hotel went first to Colt's armory. Here the whole forenoon was spent in examining objects of interest. After looking at the milling machinery, Blanchard lathes and other machines used in making revolvers, rifles and sporting arms, the party were taken to see the West six-cylinder engine, which was set to drive a Baxter engine working as an air pump. This work served admirably to illustrate its capabilities. The speed was tremendous, yet stopping, starting and reversing seemed to be instantaneous. Gatling guns, of both new and old patterns, were shown and after careful examination were wheeled into the yard and fired at a target.

One of the most notable features of the works was the main line of shafting and the 4 Allen engines by which it is driven direct. The shafting is of cast iron, 12 inches in diameter, and is hollow. The journals are 6 inches in diameter. For the class of work used in the armory no pulleys on the main lines are needed, the belts being placed directly upon the shaft itself, which acts as a continuous pulley. In the wood-working shops 36 and 48-inch pulleys are slipped on to the shaft and clamped fast.

The engines are of the well-known Porter-Allen type, but are vertical instead of horizontal. There are four cylinders with the usual disk cranks, standing in line, and the main line shafting and main shaft of the engine are coupled together at each side of the engine frame. We did not learn the speed, but should judge that it was about 120 revolutions per minute. This novel arrangement excited no little interest. The Porter governors seemed to be doing their work in a most satisfactory manner.

In another portion of the shops the visitors came upon a somewhat unexpected novelty, in the shape of a type-setting machine, which not only sets, but distributes type, carrying on both operations at the same time, and hence is not likely ever to get out of "sorts" while there is matter to distribute. The keyboard of this machine displayed remarkable inventive talent and most careful and painstaking analysis of the language. Whole words could be set up at a single depression of the keys, the misplacement of letters in words being impossible unless designedly done. Justification was not attempted, but was done by hand after a proper length of line had been set. In distribution, the machine rejected its own

type which had been turned, as well as any which might have found their way into the form from other cases in the process of correction, and also those with defective nicks. The machine is one of the most promising in its line of any that we have seen for a long time.

While one party were visiting the Armory, others were going in opposite directions, through the establishments of the Pratt & Whitney Company, Billings & Spencer, the Hartford Machine Company, and to the State Capitol and Trinity College.

At Pratt & Whitney's shops Mr. Bond showed the apparatus to which he alluded in his paper and explained the method of using it. It consists of a heavy bed, upon which are carried a rest for the bar from which measurements are to be taken, hollow hardened steel bars, or guides, which carry slides for holding microscopes and stops for adjusting the lengths of bars by end contact. Movable stops are provided for the microscope slides, against which the slides are held by electro-magnets with a constant force. The adjustments can be made with the greatest accuracy. High power microscopes with micrometer attachments are used for reading the divisions. The design for the machine was made by Prof. Rogers, and is the result of long and careful investigation in this field. In addition to the machine the copies of the yard and meter which Prof. Rogers has obtained for Messrs. Pratt and Whitney are shown. These bars, four in number, have been most carefully compared both in England and in France with the standards, and have also been compared in this country with the Washington standard copies of the originals.

The new gear-cutting machinery and the work produced by it was examined with the greatest interest. In the perfection of workmanship and smoothness of operation, the gears are unexcelled.

At Messrs. Billings & Spencer's place it seemed that iron was of no more account than wax, for it flowed, twisted and bent into almost every conceivable shape, with an ease and accuracy quite astounding to those not familiar with drop forgings. Among the novelties we saw an automatic machine for tempering the ends of the steel spindles used in making the bobbins for sewing machine shuttles. A hopper, filled with the spindles, is put in place, and the machine takes them as they come, feeds them into grooves provided for them, heats them to the exact temperature and then drops them into cold water. The movement is continuous and the temper uniform. Automatic machines of various kinds were also shown and excited their due proportion of interest. Some very difficult bands for rifles were shown, in which the metal had been forced into a deep and irregular cup shape without flaws and with great accuracy.

At the Screw Company's works the visitors found an abundance of objects for study. Time, unfortunately, did not permit our visiting these works, but the accounts which we heard from those who did were enthusiastic, and liberal praise was bestowed on machinery, workmanship and organization. The variety of work turned out was surprising.

Practical men who were in the parties expressed much satisfaction at being thus able to get away from the steady routine of shop and drafting-room, and see what others in similar lines are doing.

LABOR AND WAGES.

It is reported that the window glass manufacturers of this country will demand a reduction of 20 per cent. in all classes of skilled labor for the year 1891-92.

A report comes from the Connellsville coke region that a strike is imminent. The demands are stated as follows: In place of being paid a specified sum per wagon (the present sum being 30 cents), the miners will demand 1 cent per bushel. The coke drawers want 80 cents in place of 70 cents per oven. The operators will not concede the advance.

The Crescent Steel Works, this city, is still considered on strike.—Amalgamated Association. As the Crescent is running full without any trouble, and has been for months, it is difficult to see "the strike."

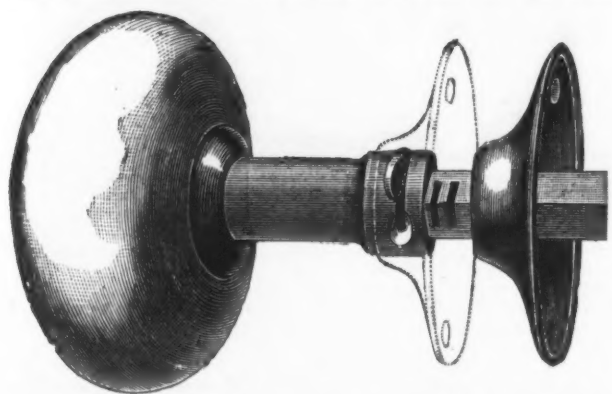
The puddlers at Portsmouth, who struck for an advance of 50 cents, failing to come to terms with employers, have gone back to work at the old rates.

The miners at points in the Hocking Valley region decided at their meeting to accept the reduction to 70 cents per ton, and will return to work June 1. The Nelsonville miners, at their meeting May 28, decided to hold out for 80 cents. The backbone of the strike is broken, and it will probably be but a question of a few days when all the miners will again be at work at the reduced rate.

The Right to Make Grain Drills.—In Rochester, N. Y., May 25, Justice Blatchford, of the United States Circuit Court, rendered a decision in the case of Charles F. Davis and another against Hiram L. Brown and others in favor of the plaintiffs, sustaining all claims under the plaintiffs' patent for improvement in grain drills. The action was brought to compel the defendants, who are extensive manufacturers of grain drills, to account for machines constructed by them in violation of the plaintiffs' patent, and for an injunction restraining a continuance thereof. The defense was that of invalidity and non-infringement of patent. This is an important decision, as it may affect, more or less, all manufacturers of grain drills throughout the United States, should Judge Blatchford's decision be affirmed by the Supreme Court of the United States, to which the case is to be appealed. The patent is said to be worth several hundred thousand dollars. This was a test case.

The circular of instruction from the acting United States Commissioner-General to the Paris Exhibition of Electricity, says it is desirable that heavy articles of machinery be sent as soon as possible, that they may be set up in ample season for the opening, August 1st. Steam or other motors are not desired unless they are expressly designed for running dynamo-electric or magneto-electric machines.

IMPROVED FASTENING FOR



DOOR KNOB SPINDLES.

Patented May 21, 1872.

The above cut represents an important improvement for securing the Door Knob neatly and securely on the spindle without the use of screws. Architects, mechanics and dealers pronounce this device superior to anything of its kind in the market. In fact, no first-class Door Knob is complete without it. No extra cost to dealer or consumer.

Manufactured only by

THE CLARK MFG. CO.

Buffalo, N. Y.

BOSS MOLASSES GATE.

Coddington's Patent.



The only Molasses Gate made with RATCHET on TIGHTENING SCREW, to secure a regular pressure, and hold it securely so as to prevent leaking.

Also,

KIMBALL'S SOLID CAST-STEEL SHOVELS & SPADES,

Lockwood's Solid Cast-Steel Hoes,

Kierser's Double Shear Cut Meat Cutters.

Send for Price List.

KIMBALL SHOVEL CO., Sole Manufacturers,

Office, 67 German Street, BALTIMORE, MD., U. S. A.

LIGHTNING HAY KNIVES.

WEYMOUTH'S PATENT.



This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bale, cutting corn stalks for feed, cutting peat and ditching marshes.

The blade is best cast steel, spring temper, easily sharpened, and is giving universal satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for exports as well as home trade, and it seems destined to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each, of 50 pounds weight suitable for shipping by land or water to any part of the world.

MANUFACTURED ONLY BY

HIRAM HOLT & CO.,

East Wilton, Franklin Co., Maine.

For sale by the Hardware Trade generally.

CHALFANT MFG. CO.,

Office and Warehouse,

109 North Fourth St., Philadelphia.

Owners and Manufacturers of the

CELEBRATED PATENT GAS-HEATING

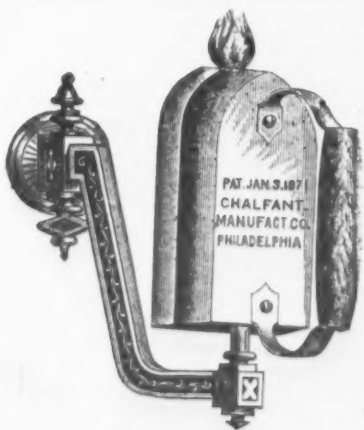
SMOOTHING IRON.

Can be heated on any ordinary gas burner in three minutes. People who have to board cannot get along without them.

Also manufacturers of the

Iron Toys and Improved Troy Polishing Iron

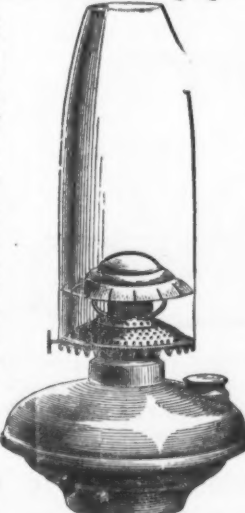
for laundry purposes. For sale by Hardware and House-furnishing dealers. Liberal discount to the trade.



PATENTED ARTICLES OF MALLEABLE IRON:

Hammer's M. I. Hanging Lamps.

Hammer's Adjustable Clamps, Hammer's Malleable Iron Oilers, 3 sizes.



Hammer's Malleable Iron Oilers, 3 sizes. Hammer's M. I. Hand Lamps, pattern Heavy Screw Clamps; strongest in the market. NEW

For Sale by all the principal Hardware Dealers. Send for price list.

Malleable Iron Castings of superior quality, and Hardware Specialties in Malleable Iron made to order.

HAMMER & CO.,

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ESTABLISHED 1838.

Bolts,

Lamps,

Bands,

Nuts,

Buttons,

Washers,

Knobs,

Couplings,

Handles,

Clamps,

Screws,

Corner Irons,

Axle Clips,

Clip Yokes,

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Top Props,

Joint Ends,

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Saddle Clips,

Lining Nails.



C. COWLES & CO.,
Manufacturers of
CARRIAGE HARDWARE,
NEW HAVEN, CONN.

J. F. WOLLENSAK'S

PATENT

Transom

Lifter

and Lock.

For all kinds of Transoms, Fanlights and Skylights.

Send for catalogue and price list.

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Patentee and Sole Manufacturer, CHICAGO, ILL.

WELLS BROTHERS & CO.,

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TAPS,

DIES,



Bolt Cutters, SCREW PLATES, AND OTHER BLACKSMITHS' TOOLS.

The Morris Sash Lock Mfg. Co.,

Manufacturers of

The Morris Sash Lock, Pat. Combined Sash Lift & Lock, Pat. Self-Locking Shutter Bar, And specialties in Builders' Hardware.

214 and 216 ELM STREET, CINCINNATI, OHIO, U. S. A.

Creasey's Ice Breaker.

In Use by

MEAT & FISH

Packers,

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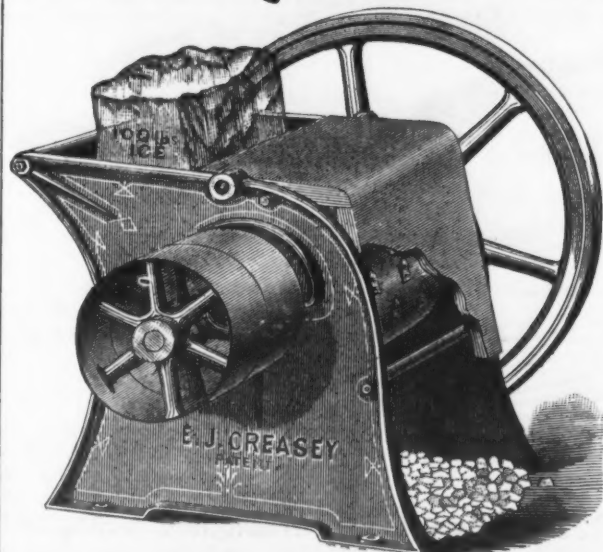
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CONFECTIONERS.

FIVE SIZES.

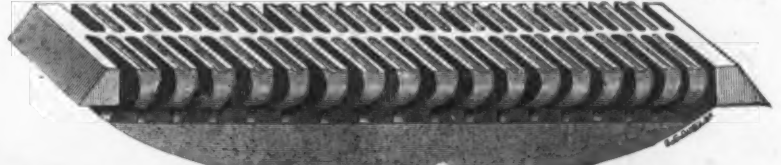
Saves Time, Money and Labor.

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MANUFACTURER OF MAITLAND'S PATENT GRATE BAR.

CLAIMS—Increased air space, hence more thorough combustion and saving of fuel; less liability of warping; one bar fills space of four ordinary bars and weighs less in proportion. Send for price.

TRENTON LOCK & HARDWARE CO.,

TRENTON, N. J.

MANUFACTURERS OF

DOOR LOCKS AND HARDWARE,

BRONZED IRON AND BRONZE METAL DOOR TRIMMINGS, BUTTS AND HARDWARE.

CAST BUTTS, DOOR BOLTS, WELL WHEELS, FLUSH BOLTS, SHUTTER BOLTS, PAD LOCKS, BARN DOOR HANGERS, & RAIL, GRINDSTONE FIXTURES, SCREW & SIDE PULLEYS, NOISELESS PULLEYS, HAY FORK PULLEYS, SHELF BRACKETS, PHILADELPHIA SLIDING DOOR HANGERS AND RAIL.

Having largely increased our facilities and line of goods, we invite the attention of the Trade.

Illustrated Catalogues Furnished on Application.

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AKRON IRON COMPANY,

AKRON, OHIO,

Sole Manufacturers of

Patent Hot Polished Shafting.

Medal of Superiority awarded at American Institute Fair of 1880.

This Shafting is superior to any in the market, and commends itself to the trade for the following reasons, viz:

- 1st. It is perfectly straight and round.
- 2d. It can be finished accurately to any desired gauge.
- 3d. It will not rust or tarnish easily.
- 4th. It will not warp or spring in key seating.
- 5th. Its surface is composed of magnetic oxide of iron, and consequently presents a journal or bearing surface that is unexcelled.
- 6th. The peculiarity of its manufacture is such as to entail loss in making it, if other than superior stock is used. Those purchasing it may therefore be assured of receiving first-class material.

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Where parties desire it we cut keyways or splines any length required, at a moderate charge.

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JOSHUA HENDY, San Francisco, Cal.

BAGNALL & LOUD,

BOSTON, MASS.,

Sole Manufacturers in U. S. A. of our Celebrated

METALINE

AND

Star Roller Bush Tackle Blocks.

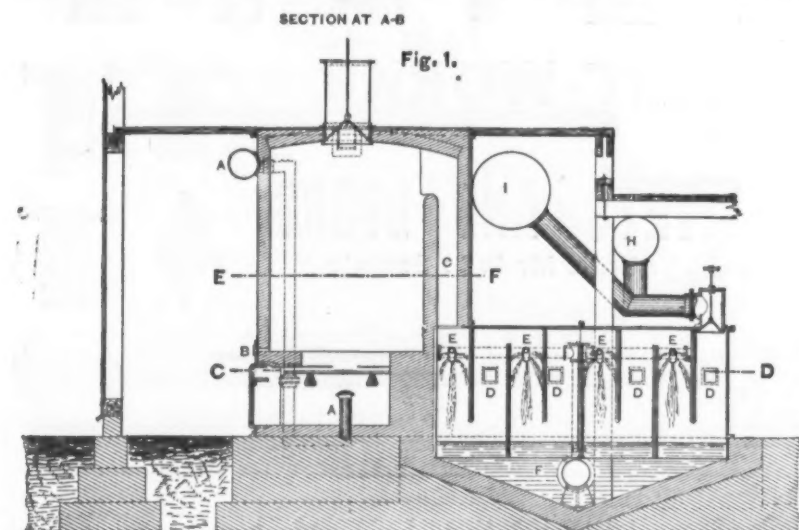
Send For Illustrated Catalogue. New York Warehouse, 33 South St.



Swedish Gas Producers.

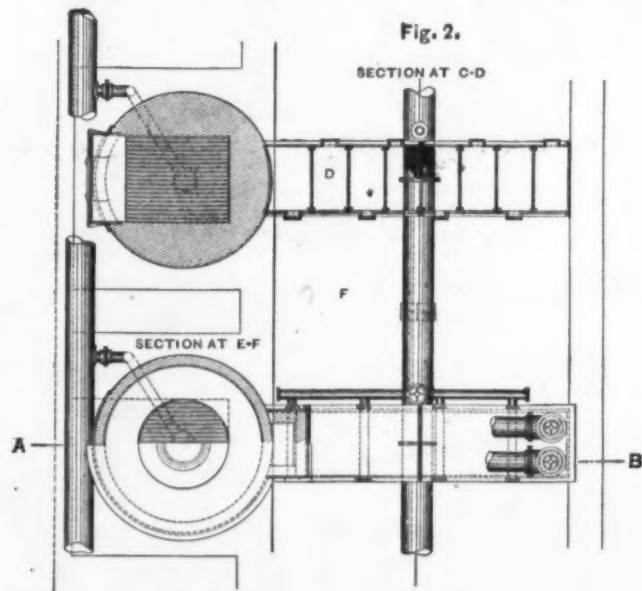
From a paper read by F. H. Daniels, of Worcester, Mass., before the American Institute of Mining Engineers, we take a de-

scription of the gas producers now used in Sweden for various grades and kinds of fuel: 1. Producers Using Sawdust as a Fuel.—Figs. 1 to 4 show a producer which is in operation at the Domnarfvet Iron Works,

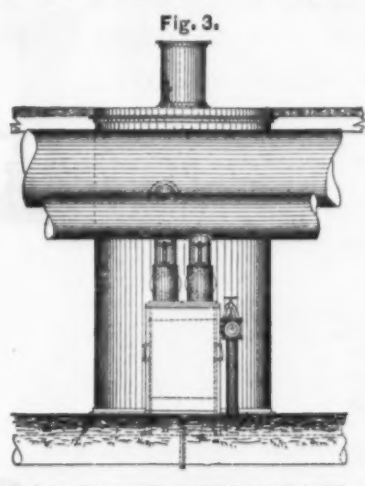


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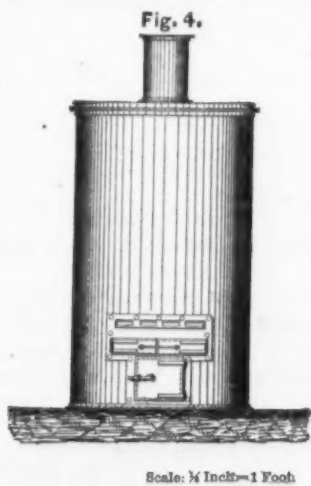
products with the condensing water fall into the canal F, and the level of the water is retained high enough to prevent the gas escaping, as shown in Fig. 1. The gas passes off from the condenser with two



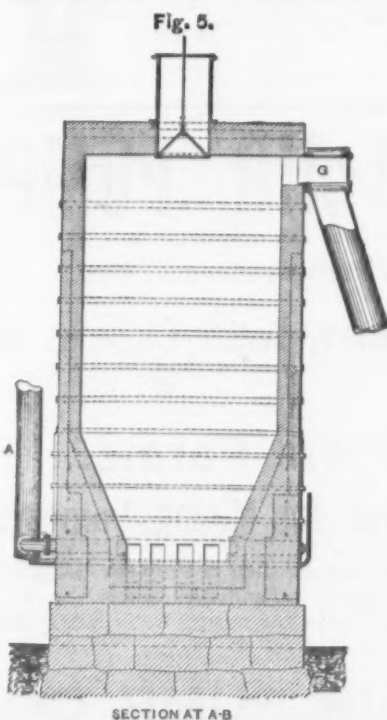
near Falun, in Darlicarlia. Fig. 1 is a longitudinal vertical section through the producer and condenser on the line A B. Fig. 2 is a plan and horizontal section at C D and E F. Fig. 3 is a near view. Fig. 4 is a



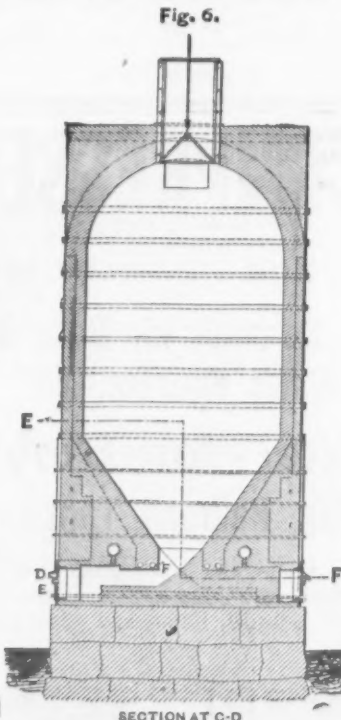
front view. The form is cylindrical, and is composed of an outside shell of boiler plate 8 feet in diameter and 14 feet high. This is lined with one course of fire-brick 6 inches thick. Blast is brought in under the grate



Scale: 1/4 Inch=1 Foot.

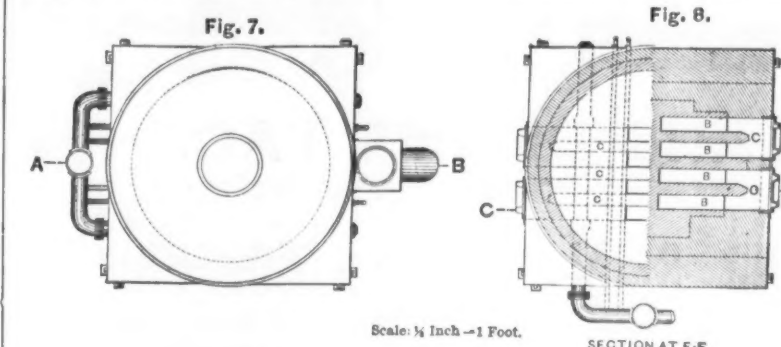


by the pipe A, and the ash-pit is arranged with two doors, one for the removal of ashes and the upper one for cleaning the grate; there is also a poke hole, B, for the removal of scaffolds. The gas passes out at C



management of this class of producers, as explosions are liable to happen if they are not properly managed, owing to scaffolds forming and falling in and allowing the air to mix directly with the gas.

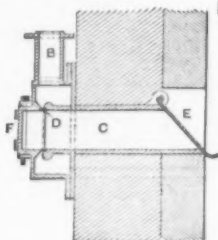
2. Producers Using short Wood as Fuel.—an old tin-plate manufacturer, who knows Figs. 5, 6, 7, 8 show a producer used whereof he speaks, some of the statements



Scale: 1/4 Inch=1 Foot.

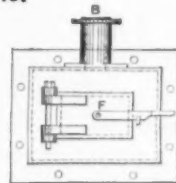
by the Uddeholm Company, at their Munkfors Works. Fig. 5 is a vertical section on line A B. Fig. 6 is a plan and Fig. 8 a horizontal section at E F. The base of the producer in horizontal section is 11 feet square and 8 feet high, above which the form is cylindrical, being 11 feet outside diameter and 9 feet inside diameter, the total height of the producer being 22 feet. The outside course of masonry is composed of brick cast out of heating furnace cinder, which is used very much at these works for building purposes. The outside shell is lined with red brick at the base and top, and finally with one 6-inch course of fire-brick. The producer is held in shape by wrought-iron rings and tie bars, as shown in Figs. 5 and 6. The blast is brought in by the pipe A, and distributed into the several ash-pits B B (Fig. 5) which are separated from each other by partition walls C C. There is one door for two ash-pits, and it is provided with a poke hole D and a peek hole E. Water is circulated through the pipes F. The gas passes out by the pipe G directly to the condenser, which is similar to that in Figs. 1 and 2. The fuel is about 16 feet deep, and is composed of the waste short wood, about 1 to 2 feet long, from the company's saw mills. They have also at the same works producers for sawdust and long wood. The gas is conducted through wooden pipes about 2 feet in diameter, and is used in three four-ton open-hearth steel furnaces and a number of heating furnaces.

3. Producers Using long Wood as Fuel.—Figs. 9, 10, 11 and 12, show a producer also in use at Munkfors. Fig. 9 is a vertical section at A B. Fig. 10 a section of charging device. Fig. 11 a vertical section at C D. Fig. 12 a horizontal section at E F and G H. The horizontal section is rectangular and the outside dimensions are 11 feet wide and 17 feet long, and the inside



I think the letter bearing upon the tin-plate trade written by Messrs. Daniel Edwards & Co., in your paper of April 23, calls for a

Fig. 10.



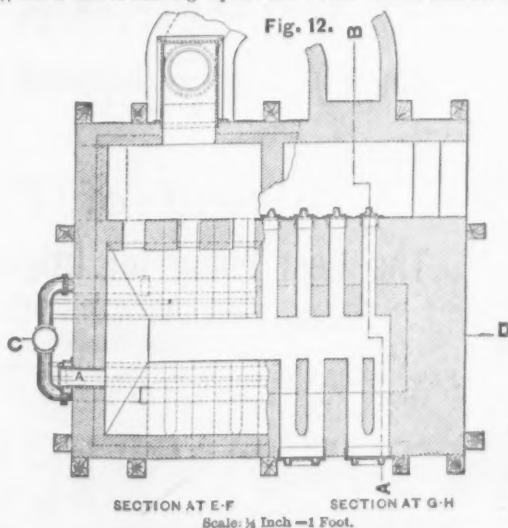
few remarks. There is one glaring error in this letter as to coke plates having only

dimensions 9 feet wide and 15 inches long. The cross-section on line B B is very much like the corresponding section of the producer for short wood; the blast is brought into the several ash-pits as shown in Fig. 11, and the general arrangement is like the producer for short wood. The fuel in long pieces is charged in at the two openings A A, also short fuel by the two charging hoppers on top of the producer. The arrangement for preventing the escape of gas while charging the long wood is very ingenious, the operation being as follows: Just before charging, blast is let on by the pipe B, and is conducted into the charging opening C by the thin annular opening at D, but not with a pressure sufficient to lift the valve E and let the air into the producer. The door F is opened and the stick of wood quickly pushed in, which opens the valve E. The air meets the gas, which prevents its entrance into the producer in any appreciable amount, and at the same time completely prevents any escape of gas, the air escaping out of the open door. After the charging is finished the blast is shut off. The gas passes out by the openings F F into the condenser. Very much trouble was experienced with this kind of fuel and very many explosions resulted, but experience was soon gained, and for several years this fuel has been used with perfect success, saving the expense of cutting the slabs into short pieces.

Charcoal and Coke Plates.

Everything that is published upon the subject of brands of tin plate, qualities of plate, or the methods of conducting business, is of great interest at the present time. The following letter, which appeared in the *Ironmonger* (London), has a direct bearing upon

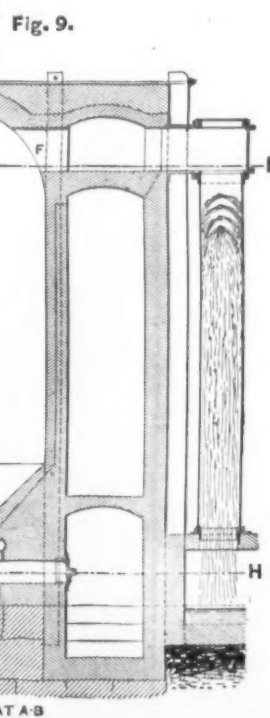
lately been introduced, and by this means the writer thinks that steel plates have been



Scale: 1/4 Inch=1 Foot.

what has been printed in recent issues of *The Iron Age*. Coming as it does from what space of time the writer of the

letter would put on the word "formerly," but it is a fact that coke plates were made 30 to 50 years before Messrs. Edwards & Co.'s works were erected. Old shippers will remember the brands F (arrow at side) Derwent, Parson, Triangle, Llan, B I, N M (in heart) Plume, P P M, T B, A B, A G (in triangle) Y, J B Cymro, (crown over) T D, Square, H F (in diamond) H F crown S G, G, Cookley, Bilston, Cynon, Ashford, C F, H (hand) S, C, B V, S N C, J S T. I remember seeing invoices dated 1835 and 1841 for F (arrow) at side and Parson. This takes us back, I think, sufficiently long enough to prove that coke plates have been used in former years as well as charcoals, and that they are not altogether of recent manufacture. It is true many coke makers have arisen during late years, but this goes to prove exactly the opposite thing to what Mr. Edwards would have us believe. I venture to say that had a great demand been made in years past for charcoal tin plates before the introduction of steel, we could not have supplied the demand. In fact, formerly charcoal iron was used, and



SECTION AT A-B

as there were really few makers of genuine charcoal iron, the relative difference in price between the coke and charcoal was much greater than now. No trade within the last 25 years has made greater progress than the tin-plate trade, and this goes to prove to my mind that it has in the main been remunerative. Take, for instance, I X plates. There is the same working in these as in I C plates. The weight is 28 pounds more, for which makers get 5/ extra, sometimes 6/, so that if manufacturers get a fair proportion of cross specifications it is quite clear they do not lose money, even at present prices, in the bulk of cases. Of late years the scale has been thrown away to some extent, but this is makers' fault, not buyers'. As to giving a guarantee for size, &c., this is simply absurd. What maker in his senses

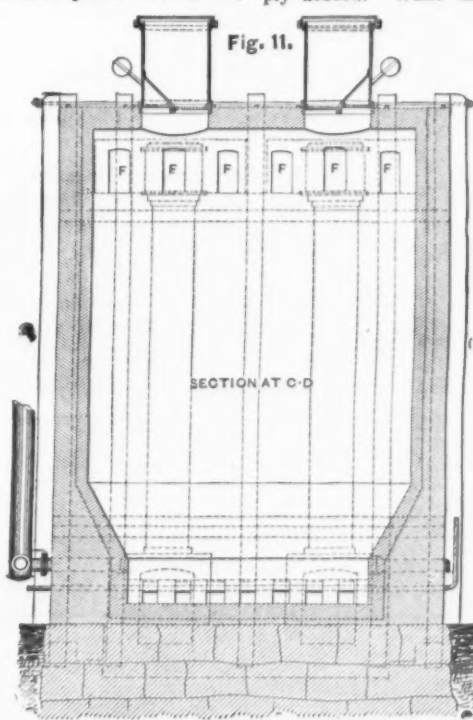


Fig. 11.

would allow himself to be shot at in this way! As plates are sheared before passing through the cold rolls, it is almost, if not quite, impossible to have them exact to size. In a falling market a one-sixteenth of an inch would involve makers in a claim if they gave a guarantee. I would suggest, as to grading, that a trade association might be formed consisting of makers and merchants, to whom any dispute as to B V quality might be referred, although there is no reason why each brand should not stand upon its own merits, as different merchants hold different opinions as to grading. Formerly, I C coke tinned plates weighed 112 pounds, net, of 225 sheets, 14 x 10. Now they weigh 108 pounds. They are supposed to be 30 w. g., but if they are they are much lighter now than years ago. The weight of 30 w. g. is 0.50 pound per square foot, giving the weight of black plates, say, 109 1/2 pounds per box of 225 sheets. Now they weigh 108 pounds tinned, which makes the plates really much lighter than the standard gauge of 30 w. g. or I C, being thus 4 pounds per box in favor of the maker over and above the old weight, which is equal to between 5d. and 6d. per box on a base price of 16/.

Yours truly, T. A.

LIVERPOOL


The Springfield (Mass.) Armory has shut down, but will probably start again July 1.



COBB AND DREW'S TACK AND RIVET WORKS,
PLYMOUTH, MASS.,
MANUFACTURERS OF

TACKS AND SMALL NAILS, COPPER BELT RIVETS AND BURRS,
Tinned Iron and Coppered Iron Belt Rivets and Burrs. Rivets, Burrs, Tacks or Nails Made to Sample.
Section and Hame Rivets in bulk or one-pound Boxes.

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Old,
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White Mountain,
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Diamond Grit,
Fisherman (Rough),
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A. F. PIKE, Established in 1820, by Isaac Pike.

PIKE STATION, N. H., U. S. A.

GENUINE OLD RELIABLE STONE

6 DOZ NO. 2
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NO. 3
NO. 4
NO. 5
NO. 6
NO. 7
NO. 8
NO. 9
NO. 10
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NO. 12
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NO. 98
NO. 99
NO. 100

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MERIDEN, NOV. 17, 1879.

THE STILES & PARKER PRESS CO.
Dear Sirs: I have used one of your Patent Drops for two years; have run it nearly every day, striking from forty to sixty gross of spoons (and striking each spoon twice) per day. We have twelve other drops at work, and must say that we can do more work and harder work with yours than with any other we have got of its size.

Yours truly,
J. M. PERKINS, Sup't.

D. & H. SCOVIL,
MANUFACTURERS OF SCOVIL'S IMPROVED
PLANTER'S HOE,
HIGGANUM, CONN., NOV. 14, 1879.

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Dear Sirs: We have run your 400 lb. Drop for two years. Its compactness and the ease with which we change the stroke, are qualities much in its favor. We like it.

Yours truly,
D. & H. SCOVIL.

THE HARTFORD COMPRESSED-AIR PUMP.

Water Driven to any Height and Distance by Compressed Air.

Country Houses Supplied Cheaply and Certainly for Bath Rooms, Water Closets, Hot and Cold Water Faucets, &c.

Plenty of Fresh Water for Stock on Farms.

The Best Pump for Irrigating, Supplying Railroad Tanks and for Mining Purposes.

This pump is being introduced into all the foreign countries, and is accepted by all mechanical men as the very best Pump in the market. It is more durable and needs less repairs than any other apparatus for like purposes, and is therefore the cheapest in the end, if not at first. Its advantages over other Windmills, Rams, and other contrivances for raising water, are quickly seen. For Circular and Price List address

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HARTFORD, CONN., U. S. A.



DE-OXYDIZED BRONZE.

DE-OXYDIZED BRONZE (patented) is an alloy of **LAKE COPPER** and best **ASIATIC TIN** in any proportion required, so as to be either as ductile as copper, as tough as iron, or as hard as steel, according to the proportion of Copper and Tin used.

The **process** of making the alloy is what constitutes its superiority over any other known alloy of Copper and Tin or any other Bronze composition. The castings made from this metal, owing to its perfect fluidity when melted, possess great density, perfect soundness and homogeneity. Unlike certain bronze and other compositions, it can be **handled without the least difficulty by any ordinary founder**, as it flows like oil in pouring.

Thus the necessity and trouble of shipping patterns, the delay in receiving castings and the expense of the double charges of freight or express, such as attend the obtaining, in many cases, of Phosphor Bronze, are entirely avoided by ordering **D. O. B. in ingots**. Where this metal has superseded other compositions of similar character, it **has endured three times as long**. In a word, we claim that **De-Oxydized Bronze** not only has none of the objectionable features attributed to similar compositions, but that it possesses all their good qualities in addition to its own merits, and advantages peculiar to itself, such as the following summary will make clear:

1. **ITS GREAT CONVENIENCE IN HANDLING** as compared to Phosphor Bronze.
2. We claim for it **SUPERIOR ANTI-FRICTION QUALITIES** to any other known Brass or Bronze.
3. **GREAT MALLEABILITY AND TENACITY.**
4. Its homogeneousness and smoothness of surface render it capable of the **HIGHEST POLISH.**
5. As before mentioned, we claim for it **UNEQUALED ENDURANCE.**
6. We claim that **JOURNALS MADE of D. O. B. REQUIRE ONE-FOURTH LESS LUBRICATING MATERIAL** than any other composition yet known.

Finally, this metal has never failed to give more than satisfaction wherever used. To sustain our statements, the following testimonials will suffice:

Henry Disston & Sons, Saw, Tool, Steel and File Works, Front and Laurel Streets, Philadelphia Smelting Company, City:

PHILADELPHIA, October 4, 1879.
GENTLEMEN: After a trial of eighteen months of your "DE-OXYDIZED BRONZE" as Journal Boxes in our Rolling Mill, where great pressure is required, we take pleasure in recommending it as being superior to any we have heretofore used. Very truly,

Office of Eagle Iron Works, 1162 North Third Street,

Philadelphia Smelting Company:

PHILADELPHIA, August 20, 1879.
GENTLEMEN: In reply to yours of the 28th inst., we beg to say that we have been using your "DE-OXYDIZED BRONZE" for over a year, and have found it better than any composition boxes we have used; and as long as

you continue to make it the same quality, we shall use no other metal in our Engine Boxes. We therefore take pleasure in recommending it to Engine Builders in general.

Yours respectfully,

HOFF, FONTAINE & ABBOTT.

Office of Union Brass Manufacturing Company,

CHICAGO, Dec. 23, 1880.

Philadelphia Smelting Company, Limited, Twelfth and Noble Streets, Philadelphia, Pa.:

DEAR SIR: In reply to your inquiry of yesterday as to our opinion of "DE-OXYDIZED BRONZE" for Railway Coach Trimmings, I beg to submit that we have used it up to present writing for the trimming of something over 100 coaches. One marked peculiarity of this metal, when highly finished, is non-liability to abrasion, and its non-affinity with the gases of the atmosphere, which in embossed work is a great desideratum. To those willing to pay more in the first cost, we would confidently recommend "DE-OXYDIZED BRONZE" Trimmings as cheaper in the end.
Yours very truly,
J. HALL DOW, President.

This metal is used for the following purposes, and we can refer to large concerns in addition to above, through the New England and Middle and Western States, who are using it in preference to any other.

1. Engine, Car and Machinery Journals.
2. Pumps, Valves and Linings, Cylinders, Pinions, Cogs, Plungers, Crank Pins, &c.

3. Car Trimmings, Harness and Coach Furniture, House Hardware, Steam Fittings, &c.
4. Wire, Sheets, Rods and Tubes.

And for any other purpose that a handsome, durable and sound Bronze is required. We especially commend it to **Railroad Companies, Car Builders, Machinists, Engineers** and others requiring a **Journal Metal** that will stand the severest friction and the heaviest pressure.

Manufactured and for sale in Ingots and Castings by the

PHILADELPHIA SMELTING COMPANY, Limited,

S. E. COR. TWELFTH AND NOBLE STS., PHILADELPHIA, PA., U. S. A.

GENUINE BABBITT.

Our Genuine Babbitt is superior to all other makes in the market in every particular. We guarantee it to be perfect in its Anti-friction qualities in machinery **AT A SPEED OF 10,000 PER MINUTE**, or at **1000 TONS PRESSURE** for **10 YEARS**. We append below testimonials from A1 houses justifying us in the above claims.

NEW HAVEN, CONN., April 11, 1881.

We have used your "Genuine Babbitt" in our Challenge Rock Breaker with excellent results, and are pleased to testify to its merits for Journals, where high speed and great pressure are required.

BLAKE CRUSHER CO.

WORCESTER, MASS., April 21, 1881.

We have used your "Genuine Babbitt" about 4 years on our wood cutting machinery bearings, run at a speed of 9000 revolutions per minute, and always with entire satisfaction.

G. W. INGALLS & CO.

WORCESTER, MASS., April 23, 1881.

Having used your "Genuine Babbitt Metal" for over 4 years on machinery that runs over 9000 turns a minute, on 1 in. shaft, 3 in. journals, I can safely recommend it for all you advertise it to do. Any person wishing to see the machinery or wanting further information can call or address,

A. L. THOMPSON, Master Mechanic,
25 Hermon street.

From J. L. MARSDEN, Supt.,
FARRELL FOUNDRY AND MACHINE CO.,
ANSONIA, CONN., Aug. 17, 1880.
The "Genuine Babbitt" we have bought from you gives perfect satisfaction in our Stone Breakers. We have it working in bearings 12 in. long and 3 in. diameter. One-half the revolution of shaft there is a pressure of 200 tons. The other half 254 tons. The shaft makes from 200 to 250 turns per minute. I think this is a very severe test, yet they have been running for more than one year.

From WITHERBY, RUGG & RICHARDSON,
Manufacturers of Wood-Working Machinery,
WORCESTER, MASS., Nov. 20, 1880.
Send us 1000 pounds "Genuine Babbitt," divided into Bars, as usual. We think the continuance of our trade with you, in the face of the constant effort made by other parties to divert our patronage, is a sufficient recommendation of your goods. We speed some journals as high as 6000.

Yours truly,
WITHERBY, RUGG & RICHARDSON.

From this it will be seen that it can have no superior, or even equal, as an Anti-Friction Metal in anything manufactured. We make besides all grades of Anti-Friction Metals,

Letter A, Guaranteed at a speed of 2000.
Letter D, Used for Shafting.

Letter B, Guaranteed at a speed of 1000.
Letter E, Used for Ag'l Implements, &c.

Letter C, Guaranteed at a speed of 800.
Letter A L, For slow speed.

All our Metals are made from best Lake Copper, Asiatic Tin, Cookson's Antimony and best Refined Lead, and in all cases run free at melting heat, without drossing, and without any necessity for heating the journals into which they are poured.

MANUFACTURERS' AND MACHINISTS' NAME PLATES, REAL BRONZE, FINISHED.

Patterns from \$3 upwards, according to Size and Style. Plates, \$3 per dozen and upward, according to Size and Style.
SKETCHES FURNISHED FOR APPROVAL BEFORE MAKING PATTERNS.

We have a specialty in this line and produce a handsomer plate, at less money, than can be obtained elsewhere.

ART AND ECCLESIASTICAL METAL WORK IN BRASS AND BRONZE,
GAS FIXTURES, ALTAR CANDLESTICKS, SANCTUARY LAMPS, CHANCEL RAILS, PULPITS, &c.

PHILADELPHIA SMELTING COMPANY, Limited,

S. E. COR. TWELFTH AND NOBLE STREETS, PHILADELPHIA, PA.

The Edgar Thomson Estate.—In the Supreme Court at Philadelphia the judges have confirmed the fourth account of the J. Edgar Thomson estate, rendered by George B. Roberts, William M. Spackman and the Philadelphia Trust and Safe Deposit Company. The income in their hands at the beginning of last month was \$47,780.70, and the principal \$913,422.11; \$25,679.04 was ordered to be paid as collateral inheritance tax; \$25,000 was directed to be set aside for the use of the executors in conducting suits now pending, and the income, further increased by \$54,390 in Texas and Pacific Railroad scrip, and \$15,540 in dividends of the Hamilton Steel Wheel Works, decided to belong to income and not to principal, was awarded to the life tenants, Lavinia F. Thomson and Charlotte F. F. Reed.

The New York Supreme Court, on the petition of the Broadway Underground Connecting Railway Company, has appointed Hamilton Fish, ex-Judge Joseph S. B. B. and John O'Brien, banker, commissioners to determine the route, hear the claims of property owners, &c. The order made by the General Term directs the commissioners to determine whether the underground railroad should be allowed to be built, and that manner in which it may be built with least damage to the use of the surface of the streets by the public, and to report their determination to the court with all convenient speed.

Special Notices.

For Sale.

The Little Schuylkill Rolling Mill, at Milldale, Schuylkill County, Pa., near Port Clinton, on the line of the Philadelphia and Reading Railroad, consisting of a Merchant Bar Mill in complete running order, with a splendid water power sufficient to run the mill two-thirds of the year. Engines, Boilers, Foundry and Machine Shop, with Lathe for turning rolls, and all other appurtenances necessary to commence operation at once. Together with dwellings, stables and large tract of land, to be sold low if applied for soon. For further particulars address or apply to J. O. RICHARDS.

No. 235 Dock Street, Philadelphia.

HAVE YOU READ THIS?
JENNINGS' DISCOUNT TABLES.
We find them correct and wonderfully "labor saving."—Sargent & Co., New York.

Your discount tables are all you claim for them. T. W. Root, with Russell & Erwin Mfg. Co., Toledo, O. Counting House Edition, 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917, 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 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SPECIAL OFFER TILL JULY 1st.
Don't Fail to Read It. From March 21st to July 1st will send the three editions of my Discount Book to any responsible house in the United States, for Examination, with privilege of returning any or all of them, provided the party will pay the return postage, which would be thirteen cents on the counting House, and two cents each on the Pocket Editions. Contents of each edition are the same. Please apply by Postal to S. H. JENNINGS, Deep River, Conn.

LEIGH'S DISCOUNT BOOK
Acknowledged by all the best work of the kind ever published. Price, by mail, One Dollar.
SPECIAL NOTICE.—This book will be cheerfully sent for examination or comparison to any responsible house requesting it, and return postage paid if book is not satisfactory.
Address, E. B. LEIGH, St. Louis Elevator, St. Louis, Mo.

Hardware and Implement Dealers.
A most desirable agency for Threshers, Horse Powers and Engines, can be had in all territory not already occupied, by writing to THE ALTMAN & TAYLOR CO., Mansfield, Ohio. Correspondence solicited.
When you apply for agency, state where you saw this advertisement.

NOTICE.
To Machinists and Engineers.

If you have especially hard iron or steel to cut in the lathe or planer, and ordinary tool steel fails to do the work, send for *Nonpareil Steel* and save yourself further trouble.
This is especially prepared steel made for cutting hard metal, and possesses the following advantages over any other special steel on the market:
1. It does not require special skill in working, and can be readily forged to any shape.
2. It does not require tempering, simple hardening in water being sufficient.
3. It will make either a roughing or finishing tool.
4. It will cut with the same facility chilled rolls, hard casting, steel and wrought iron.
5. Under hard work, at a high rate of speed, a tool made of this steel will keep a fine edge longer than any steel extant.
Manufactured by THE PHILADELPHIA STEEL FORGE, No. 315 Willing's Alley, Philadelphia, Pa.

DIE SINKER WANTED.
Must be a practical workman, capable of taking charge of Die Sinking for Carriage Drop Forgings. Address STUDEBAKER BROS. MFG. CO., South Bend, Ind.

Wanted—Cheap.
One Steam Hammer,
About 1600 to 1800 lbs. Parties having such for sale will please communicate particulars and price to P. O. Box 1503, Pittsburgh, Pa.

FOR SALE.
Ten thousand acres mineral and timber land with iron furnace. Price only \$50,000. Address, J. H. BILSTORF, Martinsburg, West Va.

STEEL:
Its History, Manufacture, Properties, and Uses.
By J. S. JEANS,
Secretary of the Iron and Steel Institute.

Section I. History of Steel; Chap. 1. History of Steel; 2. Early History in England; 3. Progress of Invention; 4. History of Bessemer Process; 5. Siemens-Martin Process; 6. Other Steel-making Processes; 7. Steel in America; 8. Germany; 9. France; 10. Austria; 11. Russia; 12. Sweden; 13. Other Countries.—Section II. Manufacture of Steel; Chap. 1. Cementation and other Methods; 2. Manufacture by Bessemer Process; 3. Siemens-Martin Process; 4. Other Methods.—Section III. Chemical and Physical Properties of Steel; Chap. 1. Phosphorus in Steel; 2. The Use of Manganese; 3. Silicon in Steel; 4. Sulphur in Steel; 5. Nitrogen in Steel; 6. Tensile Strength of Steel; 7. Mechanical Tests of Steel; 8. Analysis of Steel.—Section IV. Use of Steel; Chap. 1. Application of Steel to Railway Purposes; 2. To Shipbuilding; 3. To Bridge Building; 4. To General Purposes; 5. Guns and Armour Plates; 6. Other Purposes.

Price, 10s. 6d. per copy. Sent by post, 11s. 6d. per copy.
For sale by DAVID WILLIAMS, 83, Rude St., N. Y.

Special Notices.

THE NEW ENGLAND Manufacturers and Mechanics Institute

ARE NOW ERECTING A PERMANENT EXHIBITION BUILDING, THE

LARGEST IN THE UNITED STATES, AT BOSTON,

Containing OVER 8 ACRES of Floor Space.

Blank forms for APPLICATION to EXHIBIT at the first Annual Exhibition in the fall of 1881 can now be had by addressing the

New England Manufacturers and Mechanics Institute, 5 Pemberton Square, BOSTON, MASS.

NOTICE!

SPECIAL SALE OF RAZORS.

SEE ADVERTISEMENT ON PAGE 16

OF **BRADFORD & ANTHONY, Boston.**

ENGINE AND BOILER For Sale.

6 x 15 Horizontal Engine in good condition; also, 15-Horse Power Boiler, Heater, Pump and all other fixtures; all nearly new.

BEECHER & PECK, Lock Box 122, New Haven, Conn.

To Exchange for Hardware.

The Ozment Fruit Farm, sixty acres, well improved, good buildings and six thousand fruit trees. Sale of strawberries alone pays expenses of the place annually. Reason for selling satisfactory. Address for particulars, J. W. OZMENT, Palestine, Texas.

For Sale.

One Pair Rail Shears,

10 by 12 vertical engine, with knives and governor complete. New and never used except to make thorough test. Address, A. M. ROBBINS, New Castle, Pa.

Bissell & Welles,

Wholesale Hardware Auctioneers, 53 Chambers and 65 Reade Sts., N. Y.

Sales held weekly for the trade. Consignments solicited. We refer to the leading Manufacturers and Importers.

ENGINE FOR SALE.

10 x 14 Sault Engine; Driving Wheel, 4 feet diam. by 14 face; has been used but little, and in first-class condition. Also, one No. 6 C. B. Rogers & Co. Wood Mortising Machine, and two Saw Frames with Saws. Will be sold cheap.

Address, CLARK PECK, 100 Crown St., New Haven, Ct.

For Sale.

Hardware Stock and Business,

Located in the thriving town of Waco, Texas. Stock valued at \$20,000, all new, well assorted and suited to the requirements of the trade where located, with first-class trade already built up. For terms and full particulars address, LOCK BOX 104, Waco, Texas.

For Sale.

Second-Hand Engine & Boilers,

Portable rigs, from 4 x 10 cylinders to 9 x 12. Also Stationary Boilers, from 10 to 50 horse-power. A large quantity of Engines from 6 x 10 to 9 x 12 cylinders, all in good repair. Second-hand Pipe of every description. Address, YOUNG & LOCKE, Titusville, Pa.

HARDWARE For Sale.

Those wishing to buy a country trade and complete stock will find a bargain by addressing A. Box 65, Office of The Iron Age, 83 Reade St., New York.

TO CAPITALISTS. FOR SALE.

A Rolling Mill and Nail Factory, located on the Pennsylvania Railroad, in the iron and coal region of Pennsylvania, will be sold to close out an estate. The works have a capacity of 6000 tons per annum, are now in first-class running order, and have always done a successful business.

Address, ADMINISTRATOR, Office of The Iron Age, 83 Reade St., New York.

FOR SALE.

U. S. Patent for Freight Car Lock. If it be desirable to lock a freight car door and keep it locked, this device will do it. It is more direct in its action and costs less than half anything on the market. Address E. P. Hall, 167 Madison St., Chicago, Ill.

PARTNER WANTED.

Or For Sale,

A Good Pipe & Machine Foundry,

all complete, and in good working order. Foundry brick, 125 feet by 20 feet, 25 feet high, 2 steam and 1 hand crane, 2 cupolas, 1 Root blower, good power, pipe flasks and patterns, all in good order, with large lot of machine patterns; pattern shop, 30 feet by 75 feet; good office, 1 room. Reasons for selling, want of operating capital. For particulars address, D. GILES & Co., Chattanooga, Tenn.

Special Notices.

SECOND-HAND and NEW TOOLS FOR SALE LOW.

June List No. 1.

1 Pit Lathe, 2 1/2 ft. swing, will turn a pulley as wide as 9 ft. face.
1 Pit Lathe, 16 ft. swing by 30 in. face; has gear cutting attachment.
1 4 ft. x 12 in. Screw-cutting Lathe. New.
1 4 ft. x 12 in. Screw-cutting Lathe. Second-hand.
1 6 ft. x 12 in. Screw-cutting Lathe. Second-hand.
1 New Engine Lathes, soon to arrive. Swing from 16 in. to 60 in.; different lengths of bed.
4 Foot Lathes, 4 in. to 9 in. swing. Second-hand.
1 Hand Lathes, 7 to 20 in., different lengths. Second-hand.
1 9-in. Shaper, Hewes & Phillips. Second-hand.
1 12 in. Shaping Machine, Ohl make. Good.
1 Heavy Shaper, 6 in. Second-hand. Good.
1 Lat Drill, from 11 in. to 15 in. Second-hand.
1 Double Head Cam Cutter, Pratt & Whitney make. Second-hand.
1 Milling Machine, Lincoln pattern. Second-hand.
3 Manhattan Arms Co. Millers. Second-hand.
1 Face Milling Machine. Second-hand.
1 New 4-spindle Drill Press.
4 Wall Drills, heavy. Second-hand.
1 Screw Head Slicer. Second-hand.
1 Amos Proffitt Machine. Second-hand.
1 Second-hand Profiling Machine.
1 3 ft. x 16 in. Bigelow Power Planer. Second-hand.
1 3 ft. x 12 in. Iron Planer. Second-hand.
1 3 ft. x 25 in. Hand Planer for Iron. Second-hand.
1 Slitting Machine. Second-hand.
1 Power Hammer. Second-hand.
1 Steam Hammer, 11 x 16 cylinder. Second-hand.
1 Jeweler's Power Roller, 6 in. wide. Second-hand.
1 Boiler Plate Power Punch. Second-hand.
1 Double-Acting Presses, for power. Nearly new.
1 Single-Acting Presses, for power. Nearly new.
125 Foot Presses. Nearly new.
1 Bliss & Williams Power Punch. Nearly new.
1 Medium Power Punching Presses. Second-hand.<

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, June 1, 1881.

Ease in the money market prevailed all through the week under review, our banks, trust companies and other moneyed corporations seeming to be burdened with a surfeit of funds. Loans are freely offered to-day at 3 per cent. for four months. Prospective Treasury payments to the amount of \$100,000,000 before the close of the year, together with the active demand for government bonds and other securities, readily account for the situation, to say nothing of the satisfactory condition of the foreign trade and remarkable course of the bullion movement ever since the year commenced. The public debt was reduced \$11,150,721 during the month of May.

There have been several reductions in the posted rates of sterling exchange during the week, but to-day the leading authority marked up bills on London to \$4.84 to the pound sterling.

The bank return for the week shows a loss of \$2,015,675 in surplus reserve, which now stands at \$14,722,000, against \$16,128,450 at this time last year, and \$4,138,300 at the corresponding period in 1879.

The importations of specie and bullion at this port during the week ending May 27 were \$26,807, consisting of \$5312 in gold and \$21,495 in silver, as against a total of \$33,462 for the week ending May 29 last year. The importations since the 1st of January and since the 1st of August compare as follows with the movement during the corresponding periods last year:

	Since January 1—1881.	1880.
Gold.....	\$28,085,617	\$1,263,430
Silver.....	1,308,746	2,337,421
Total.....	\$29,394,363	\$3,600,851
	Since August 1—1880.	1879-80.
Gold.....	\$93,364,585	\$76,201,402
Silver.....	3,780,097	5,314,915
Total.....	\$97,144,682	\$81,516,317

The stock market has been generally lower. On Friday the whole list was severely raided, notably by speculators in control of the Southwestern stocks, the large operators evidently desiring a "wholesome reaction." Toward the close of the week there was a partial recovery. The most active stocks were Lake Shore, Western Union Telegraph, Union Pacific, Northwestern, Pacific Mail, Milwaukee and St. Paul, C. C. and I. C., Southwestern stocks, and the coal shares. The largest decline was in Canada Southern, 3; New York, Lake Erie and Western Preferred, 3; Pacific Mail, 3½; Northwestern, 3½; Northwestern preferred, 3½; St. Paul, 2½; New Jersey Central, 3½; Lake Shore, 3½; Wabash Pacific, 2; Chicago and Indiana Central, 2½; Rock Island, 2½; Michigan Central, 2½; Illinois Central, 2½; Omaha, 2½; Omaha preferred, 2; Chicago and Alton, 2½; St. Louis and Iron Mountain, 2. United States bonds were strong, with an active inquiry for 4s and 4½s, the former advancing to 121½ in London, the highest point ever reached. State bonds were quiet.

The following is an analysis of the bank totals of this week compared with that of last week:

	May 21.	May 28.	Comparison.
Loans.....	\$34,192,800	\$33,025,700	Inc. \$1,167,100
Specie.....	80,518,500	79,114,800	Dec. 1,403,700
Legal t'd's	17,803,000	16,631,800	Inc. 1,171,200
Tot. reserve	92,514,300	97,768,300	Dec. 5,254,000
Deposits.....	326,611,700	337,182,900	Inc. 10,571,200
Reserve re-quired.....	81,652,925	81,035,700	Inc. 617,225
Surplus.....	16,738,375	14,732,600	Dec. 2,005,775
Circulation.....	19,135,300	19,301,200	Inc. 165,900

Government bonds were strong at the close for the 4s and otherwise steady, at the following quotations:

	Bid.	Asked.
U. S. 6's 1881 registered.....	102½	—
U. S. 6's 1881 coupon.....	102½	—
U. S. 5's 1881 registered.....	101½	—
U. S. 5's 1881 coupon.....	101½	—
U. S. 4½'s 1881 registered.....	115½	—
U. S. 4½'s 1881 coupon.....	115½	—
U. S. 4's 1897 registered.....	117½	—
U. S. 4's 1897 coupon.....	117½	—
U. S. Currency 6s 1895.....	119	—
U. S. Currency 6s 1897.....	119	—
U. S. Currency 6s 1899.....	119	—
U. S. Currency 6s 1899.....	119	—
" Window "	103½	104

MINING STOCKS.

The following were the closing quotations for Mining Stocks:

	Bid.	Asked.
Amie.....	49	50
Alma.....	7-50	—
Alta Mont.....	1.80	1.95
American Flag.....	28	—
Bassick.....	11.00	—
Bell Isle.....	49	50
Boston C.....	60	70
Bocatel.....	3.00	—
Big Pittsburgh.....	19	25
Bonanza C.....	19	25
Buckeye.....	2.95	3.10
Bulwer.....	6.37½	6.62½
Bodie.....	75	—
Boulder C.....	1.60	—
Calaveras.....	1.40	—
Cale. R. H.....	1.65	1.75
Crescent.....	2.45	2.55
California.....	2.90	—
Climax.....	2.90	—
Catalpa.....	2.90	—
Consolidated Imperial.....	2.90	—
Chrysolite.....	5.12½	5.37½
Cherokee.....	60	61
Dunkin.....	1.50	1.55
Dahloner.....	6	7
Dunderberg.....	7	—
Durango.....	30.00	—
Eureka C.....	30	30
Findley.....	30	30
Great Eastern.....	30	30
Gold Placer.....	2.65	2.70
Cold Spring.....	30	—
Goodshaw.....	30	—
G. Prize.....	30	—
Granville.....	5.75	—
Green Mountain.....	1.05	1.10
Hibernia.....	1.00	1.10
Hukill.....	15.00	—
Horn Silver.....	15.00	—

Independence.....	38	—
Iron Silver.....	2.10	2.25
Lacrosse.....	33	35
Leadville.....	1.40	—
Leucorne.....	11	12
L. Chief.....	1.35	1.40
Little Pitts.....	3.50	4.00
Moose.....	1.25	1.30
Silver Boy.....	1.15	1.20
Navajo.....	95	95
North Star.....	13	15
Ori. and Mil.....	2.00	2.05
Plumas.....	50	—
Red Elephant.....	22	23
Rappah.....	19	20
R. Sun.....	2.50	—
Robinson.....	10.87½	11.00
South Hill.....	3.40	—
Stormont.....	1.10	—
Silver Cliff.....	6.62½	6.75
Sutro.....	2.30	2.40
San Pedro.....	4.50	4.30
Spr'g Val.....	3.50	4.00
Tioga.....	50	—
Tuscarora.....	28	—
Willshire.....	1.30	—

GENERAL HARDWARE.

While we cannot report anything like an active demand for General Hardware, business is fair, considering the season, and values are remarkably steady. In foreign Hardware a fair business in importation orders is reported.

The many friends of Mr. M. J. Woodruff, assistant treasurer of Russell & Erwin Mfg. Co., will be pleased to learn of his safe arrival in this city by the Galia, of the Cunard line, on Monday last. Mr. Woodruff, during his three months' holiday, visited many of the chief points of interest in Europe.

The demand for Nails is steadily improving, and a fair amount of business has transpired during the week. We quote rod. to 60d., \$3.05 @ \$3.15, net, according to quantity.

Flagler, Forsyth & Bradley, No. 298 Broadway, have taken the agency of the North Wayne Tool Company, Augusta, Me., and quote their goods as follows, net:

	Per doz.
Ranger, Painted, Ground Sharp and Boxed.....	\$8.50
Field King.....	9.00
Clippers.....	11.00
Razor Steel.....	12.00
Solid C. S. L. Wt.....	12.00
Bush.....	8.50
Railroad.....	8.50
Clippers.....	9.00
C. S. Handled Axes.....	9.00
Grass Hooks.....	3.25

Mr. Winthrop Parker, who has become well known to the trade from having been in the employ of Sargent & Co. since 1870, was admitted to the Bar on the 27th of May, as attorney and counselor at law. Mr. Parker was recently graduated from the University Law School.

Durrie & McCarty, No. 97 Chambers and St. Read's st., have been appointed agents for Plumb, Burdick & Barnard, Buffalo, N. Y. They will keep in stock a full assortment of Carriage, Tire and Machine Bolts and kindred goods, which they will offer to the trade at best factory terms.

The Stanley Works have in stock at their warehouse, No. 79 Chambers street, a full assortment of Record's Patent Strap Hinges, which they quote to the trade at best factory prices.

The Table Cutlery Manufacturers' Association held a meeting in this city to-day, but at the close of business their action, if any, had not transpired.

We invite the attention of the trade to the advertisement of H. W. Hill & Co., of Decatur, Ill., on the 29th page.

The Cohoes Axe Mfg. Co. have established an agency with Union Hardware Co., 87 Chambers and 69 Reade streets, where samples and a full line of the goods can be found.

Louis B. Hanks, firm of Hundley & Hanks, will sail for Europe, on a business trip, on Saturday next by the steamship Belgenland for Antwerp. The European demand for American Axe, Hammer and other hand tools and woodwork has been steadily growing during the past few years, and with a better knowledge of the requirements of European countries, this firm expect to greatly increase their export business.

The attention of the trade is invited to the advertisement of Lambeth's Improved Fly Fans on page 23. These Fans have had a large sale, over 50,000 being now in use. They are made in three styles—bronzed, nickel-plated or decorated china base. They revolve noiselessly above the head, with no inconvenience to persons seated at the table. For shipment the Fans are securely packed one dozen in a case, each case weighing, according to style of base, from 75 to 120 pounds.

BRITISH IRON MARKET.

[Special Report by Cable to The Iron Age.]

LONDON, June 1, 1881.

Scotch Pig.—Since last Wednesday prices have fluctuated in both directions, but the market is now steady, and there is a fair amount of business doing. The following are to-day's quotations, showing a reduction of 6d. in both Gartsherrie and Coltness, and an advance of 6d. in Eglington:

Gartsherrie, alongside, Glasgow.....	55 6
Coltness.....	55 6
Glenarnock " Ardrossan.....	54 6
Eglington.....	47

Lighterage from Ardrossan to Glasgow is 2/6 per ton.

Manufactured Iron.—The market continues weak, with but little demand. Best Staffordshire Bars are quoted, nominally, £7.

Steel Rails.—A fair business is doing under a steady demand. We quote ordinary sections, nominally, £6 @ £6 10/.

Iron Rails.—Business is very light, and quotations are nominal. Welsh are quoted £5 5/ @ £5 10/.

Old Rails.—A fair business is doing and prices are steady. We quote Old Tees, £3 15/.

Scrap.—But very little business. Wrought is quoted £3 nominally.

IRON.

American Pig.—While there is perhaps more inquiry for Iron this week, there is not much change for the better in the condition of the market, which may fairly be called dull. Sales are reported of 1000 tons Thomas in lots at \$24 for No. 1 and \$22 for Nos. 2 and 2 X, also about 2500 tons of No. 1 Foundry at Perth Amboy, in lots, on private terms. We quote Foundry No. 1, \$24; Foundry No. 2 X, \$22; Gray Forge, \$20.

Scotch Pig.—Sales are reported of about 700 tons various brands, in lots, on private terms, and 100 tons Carnbroe at about our quotation. The market still lacks animation, and its tone is weak and in buyers' favor. We quote: Eglington, \$21; Carnbroe, \$22; Coltness, \$23.50; Glenarnock, \$22.50, and Gartsherrie, \$22.50 @ \$21. Middlesboro' Iron is quoted at \$17.50 @ \$18, and at the latter figure we hear of a sale of 300 tons ex store.

Rails.—No transactions in new Rails have come to our notice during the week. Steel Rails at mills are quoted \$56 futures and about \$60 for early delivery, and Iron \$48 @ \$50.

Old Rails.—The demand for Old Rails is light and no sales worthy of mention have come to our notice during the week. We quote nominally, Ts, \$26.50, and Double Heads, \$27.50.

Scrap.—A sale is reported of 500 tons No. 1 Wrought Scrap, for shipment, at a price equal to \$27.50. The demand continues light. We quote spot lots, \$27 ex store, and \$29 from yard, for strictly No. 1 Wrought.

METALS.

Copper.—Since our last report the market has become unsettled; Lake Copper has been selling in lots at 18½¢ and 18¼¢, and is now quoted at 18½¢ @ 18¼¢, cash. Sales foot up about 200,000 pounds Lake Superior. The English market is better; Chili Bars—the cable informs us—have advanced 30/ per ton, to £59 10/, and Best Selected commands £66. "London, May 21.—This market remains quiet, but prices, although not having undergone any very great change either for the better or the worse, are, nevertheless, a shade stiffer for Chili Bars, thereby indicating that holders are not very readily sellers at ruling rates. This is not surprising, for the supply of Chilean produce has for some time past been much curtailed, the importance of which we have so repeatedly pointed out and endeavored to impress upon the minds of our readers, and these reduced supplies have resulted in making the statistics of Chile Copper to become more and more favorable. The bi-monthly returns show the imports of Chilean produce into Liverpool and Swansea during the first half of this month to be only 648 tons, while the deliveries for the same period were 1242 tons, and which reduces the stock in first and second hands in the above ports to 31,466 tons, as compared with 32,060 tons on the 20th ult. Notwithstanding these improved statistics, yet the demand is not stimulated, first, because consumers can buy Spanish pyrites and precipitates more advantageously than they can secure Chili Bars; and, secondly, on account of the total stock of other kinds of Copper being so very heavy that it forms a most effectual check to the expansion and development of the speculative demand." Manufacturers remain as under: Bottoms, 20¢; Braziers, according to size, 28¢ @ 34¢; Circles, 31¢ @ 34¢; Segment Sheets, 31¢; Fire-box Sheets, 28¢; Sheathing, 26¢, and Bolt Copper, 28¢.

Tin.—Our market has not materially changed either in price or tone. The jobbing demand continues satisfactory. London cables Straits Tin £88 on the spot, the market being firm. In Holland 23,500 alabs Banca sold last Tuesday at 52.62½ guilders per 50 kilos, the London parity thereof being £88 10/, which would show, to say the least, a confident feeling prevailing. The cable furthermore tells us that the May deliveries have been in England 1100 tons and in Holland 600 tons, and adding thereto the deliveries of 800 tons in the United States, there is an aggregate distribution for the month of 2500 tons, reducing the visible supply on June 1, in Europe and America, some 1300 tons. These figures will be sure to tell by and by, but we simply write facts, and our readers will be swift to discern where their interests are lying. Another cable dispatch announces that the May shipments have been from the Straits to the United States 350 tons, and to England 200 tons, while from Australia to the latter country there were shipped 500 tons. These are very small shipments. Singapore mean-while cables \$27 per picul, which is equal to about 20¢ landed here. We quote at the close, large lots Straits, 19½¢ @ 19¼¢; Australian, 19½¢, and Billiton, 19¼¢. The price in London May 1, according to Messrs. W. T. Sargent & Sons, was: For Straits Tin, £37 against £30.15/ in 1880; £68.10/ in 1879; £61 in 1878; £69.10/ in 1877, and £72 in 1876. First quarter's shipments from the Straits to the United States, Messrs. Gillilan, Wood & Co., Singapore, states, were only 9875 piculs, against last year 53,481; 1879, 35,322; 1878, 19,411; 1877, 12,698, and 1876, 10,193; in other words, they have fallen below the lightest since 1875. "London, May 21.—The price of this metal has continued to tend in buyers' favor, while a fair number of transactions have from day to day been carried through. The future of this market appears somewhat uncertain; consequently operators for the most part act cautiously, and at times show not a little hesitation before entering into forward contracts. In the one case statistics appear favorable, for there is reported only a

limited supply, while deliveries are well maintained. These features naturally give promise of an advance being effected in prices; but then, on the other hand, there is such little disposition manifested to buy beyond actual wants that holders may be induced to make concessions in order to stimulate the demand." Tin Plates.—Foreign advances point to a culmination in affairs affecting tin-plate makers at no distant date. Every week brings reports of further embarrassments among them, so that the output is gradually, but surely, being reduced, and stocks are being drawn upon to a considerable extent. Returns to date will doubtless show a large diminution. In the meantime our market continues quiet at the ensuing quotations for large lots, ordinary brands, per box: Charcoal Bright, \$5.87½ @ \$6; ditto Ternes, \$5.37½ @ \$5.50; Coke Tin, \$4.90 @ \$5, and ditto Ternes, \$4.80 @ \$4.87½.

Lead.—Since our last report about 700 tons common Domestic have been sold at 4¼¢, and later on 200 tons ditto at 4½¢. The market closes very quiet, with 4½¢ asked. Refined is nominally worth 4½¢. "London, May 21.—It is satisfactory to at last be able to state that some slight improvement is perceptible in the demand for this metal, chiefly for shipment. This has had a beneficial influence upon prices, which have advanced to £14 10/ @ £14 15/ for common English pigs." Manufacturers are quoted as follows: Sheet Lead, 7¢; Lead Pipe, 6½¢; Tin-lined ditto, 15¢, and Black Tin Pipe, 40¢.

Spelter and Zinc.—Spelter has remained dull and inactive at, nominally, 4½¢ @ 5½¢, according to brand, for Common Domestic, and 5½¢ for Silesian. Messrs. W. T. Sargent & Sons, London, quote the price on April 1, £15 15/, against May 1, 1881, £15 7/6; May 1, 1880, £19 15/; 1879, £14 15/; 1878, £18; 1877, £20 5/, and 1876, £24. "London, May 21.—This market continues steady, both as regards prices and the demand. The shipping trade keeps somewhat sluggish, and in order to make business practicable slight concessions have at times been made, although the official quotation for Silesian is rather higher."

Antimony.—Has been selling in small lots at 14¼¢ @ 14½¢.

FOREIGN TRADE MOVEMENTS.

The following is a summary of the foreign trade movements for the week:

For the week ended May 28:

	1879.	1880.	1881.
Total.....	\$3,443,829	\$9,927,497	\$8,600,722
Prev. reported.....	120,847,028	201,723,167	108,750,658

Since Jan. 1... \$126,201,731 \$211,744,794 \$177,351,380

Included in the imports of general merchandise for the week were articles valued as follows:

	Quantity.	Value.
Anyils.....	255	\$5,843
Brass goods.....	33	4,512
Bronzes.....	8	2,527
Chains and anchors.....	42	1,524
Clocks.....	18	2,751
Cutlery.....	125	8,597
Cutlery.....	125	44,193
Pins.....	11	1,155
Gas fixtures.....	1	1,004
Iron ore, tons.....	6,927	16,987
Hardware.....	31	9,177
Iron, pig, tons.....	4,540	85,450
Iron, sheet, tons.....	22	2,004
Railroad bars.....	23,539	20,672
Iron ore, tons.....	6,927	16,987
Iron, other, tons.....	1,181	51,285
Lead, pigs.....	385	1,836
Machinery.....	85	10,543
Metal goods.....	193	21,449
Nails.....	7	2,476
Needles.....	22	12,049
Nickel.....	15	3,166
Old metal.....	1	404
Platedware.....	1	1,468
Saddlery.....	5	1,468
Steel.....	10,585	175,700
Spelter.....	136,404	6,423
Silverware.....	11	2,305
Tin, boxes.....	20,327	91,108
Tin, 365 alabs 371,937 lbs.....	70,072	7,525
Wire.....	237	3,411
Zinc.....	82,687	3,411

The following are the imports of leading articles, compared with previous dates:

	For the week.	21 weeks of 1881.	Same time 1880.	Same time 1879.
Cutlery, pkgs.....	31	2,957	4,181	6,166
Hardware, pkgs.....	31	508	616	616
Iron, R. R. bars.....	23,539	136,893	248,396	—
Lead, pigs.....	385	13,324	34,973	—
Steel, pkgs.....	30,585	364,611	248,199	—
Tin, boxes.....	20,327	508,692	791,081	—
Tin slabs, lbs.....	371,937	6,482,293	15,558,888	—

EXPORTS OF SPECIE.

For the week ended May 28:

	Total.	Previously reported.
Total.....	\$50,428	\$4,650,083

Previously reported.....

ne time in 1879	6,507,990	
ne time in 1878	7,973,499	
ne time in 1877	15,260,274	
ne time in 1876	25,127,750	M
ne time in 1875	37,382,727	P
ne time in 1874	34,405,965	P
ne time in 1873	22,403,660	P
ne time in 1872	25,717,361	C

IMPORTS

Of Hardware, Iron, Steel and Metals into
the Port of New York, for the Week ending
June 1, 1881:

Hardware.	Perkins & Choate,
Alvarez B.	Spiegel, tons, 300
Machinery, pkgs., 2	Phelps, Dodge & Co.
Baker Hermann & Co.	Pig, tons, 835
Arms and cutlery, 76	Strong S. A.
Coventry Machinist Co.	Flange rails, tons,
Cases, 2	127
Downing, Sheldon & Co.	Whitney A. R.
Case, 1	Tubes, 1292
Cask, 1	Pig, tons, 1050
Duval H. R.	Rail ends, tons, 625
Wire nails, cks., 30	Old rails, 535
Cases, 4	Old scrap, tons, 200
Dodge Alfred,	Spiegel, lot
Cases, 5	Rail-rod iron bars,
Field Alfred & Co.	1010
Arms, cs., 4	Wire rods, bbls., 1645
Cases, 8	Bars, 7
Folsom H. & D.	Bundles, 260
Arms, cs., 34	Casks, 280
Grain Cutlery Co.	Scrap, tons, 202
Cases, 4	Ore, tons, 472
Hartley & Graham,	
Cases, 21	
Hartman & Co.	
Machinery, pkgs., 9	
Case, 1	
Howard Bros. & Read,	
Cases, 30	
Hillick A. H.	
Chains, cks., 1	
Anvils, cks., 1	
Anvils, 100	
Vices, 20	
Hill, Clark & Co.	
Machinery, cs., 5	
Irvine Theo. & Sons,	
Saw, case, 1	
Anvils, 215	
Jacob Bros.,	
Machinery, cs., 1	
King E. G. & Son,	
Arms, cs., 4	
Lescher, Whitman & Co.	
Case, 1	
Moore's J. P. Sons,	
Arms, cs., 22	
Mose F. W.	
Files, cks., 5	
Price G. B.	
Machinery, pkgs., 3	
Rogers Henry,	
Packages, 1	
Seaville Mfg. Co.,	
Cases, 10	
Schoverling, Daly &	
Gales,	
Guns, cs., 11	
Cases, 10	
Squires H. C.	
Cases, 3	
Ward Asile,	
Cases, 5	
Wiebusch, Hilger & Co.	
Cases, 67	
Winchester Arms Co.	
Cases, 7	
Witte John G. & Bro.	
Coffee machs., cs., 7	
Case, 1	
Order:	
Machinery, pkgs., 23	
Files, cks., 17	
Gun barrels, cs., 14	
Iron.	
Alexandre F. & Sons,	
Hoop Iron, bbls., 125	
Baring Bros. & Co.	
Scrap, tons, 400	
Pig, tons, 746	
Ore, tons, 531 1/2	
Carey & Moon,	
Rods, bbls., 141	
Coddington T. B. & Co.	
Sheet Iron, bbls., 67	
Sheet Iron, bbls., 143	
Dana & Co.	
Rails, samples, bbl., 1	
Drexel, Morgan & Co.	
Ore, tons, 317	
Irwin Richard & Co.,	
Pig, tons, 200	
Learned Edward,	
Crank shaft, 1	
Lee James & Co.	
Pig, tons, 200	
Macias A. F. & Co.	
Old Iron, cs., 5	
Parker A. B.	
Wire rods, bbls., 278	
Pascual, L. & Co.	
Plates, cs., 1	

OLD METALS, PAPER, STEEL, &c.

The purchasing prices offered by dealers are as follows:

Copper, heavy.....	10.16	10.17
Copper Bottoms.....	13	14
Yellow Metal.....	10.09	10.05
Brass, heavy.....	11.13	11.14
Brass, light.....	10.09	10.05
Composition, heavy.....	11.13	11.14
Lead, heavy.....	10.04	10.04
Tea Lead.....	10.03	10.03
Zinc.....	10.03	10.03
Pewter, No. 1.....	13	13
Pewter, No. 2.....	10.08	10.09
Wrought Iron.....	10.00	10.00
Light do.....	10.00	10.00
Stove Plate.....	10.00	10.00
Machinery do.....	15.00	16.00
Grate Bars.....	5.00	6.00

The prices current for Rags, &c., are as follows:

Canvas, Linen.....	3 1/2 c.	4 c.
White Cotton, New.....	3 1/2 c.	4 c.
White, No. 1.....	3 1/2 c.	4 c.
No. 2.....	2 1/2 c.	3 c.
Seconds.....	1 c.	1 1/2 c.
Soft Woolen.....	8 1/2 c.	9 c.
Mixed Rags.....	1 1/2 c.	2 c.
Gunny Bagging.....	1 1/2 c.	2 c.
Jute Butts.....	2 c.	2 1/2 c.
Kentucky Bagging.....	3 1/2 c.	4 c.
Rock Stock.....	1 1/2 c.	2 c.
Newspapers.....	1 1/2 c.	2 c.
Waste Paper and Scraps.....	1 1/2 c.	2 c.
Kentucky Bale Rope.....	4 c.	5 c.

PHILADELPHIA.

Office of The Iron Age, 220 South Fourth St.,
PHILADELPHIA, June 1, 1881.

Pig Iron.—The market during the week has been rather quiet, and the tendency in the direction of lower prices. Nominally there is no change, but there need be no hesitancy in making the assertion that sellers of Foundry Irons are prepared to accept business at a decline of \$1 per ton. Comparing quotations to-day with those current the last week in 1880, we find the following changes: Foundry Irons about \$1 lower; Mill Irons nearly \$1 higher; Bessemer Irons \$3 lower; Scotch Iron \$1 @ \$2 lower; Middlebrook's nominally unchanged, but less saleable, unless at concessions. It is difficult to account for the various changes, except on the ground that Foundry Irons have been relatively too high, and also that they have been affected by competition with Scotch Iron. Another noteworthy feature is that there would probably be no weakness here but for the position of the New York market. Reports of heavy sales at low prices in New York compel consumers in this vicinity to insist upon equal terms, which the leading companies appear now to be willing to accept, so that \$24 for No. 1 Foundry may be regarded as a fair quotation for ordinary Lehigh brands. The speculative element appears to be centered in

New York, and prices have gradually weakened in the endeavor which has been made to unload. In this market there has been a steady consumptive demand and nothing whatever of a speculative character, so that it is quite likely that prices would have been maintained but for the break in neighboring markets. As regards the future, there is little to be said. Seen from a Philadelphia standpoint, the market is in a healthy condition, consumers full of work and usually with light stocks, so that a steady demand appears to be assured, although it will be impossible to make one price for New York and another for Philadelphia. It is claimed that, New York being the leading depot for foreign iron, competition is greater than in this market, and, further, that many thousands of Lehigh Irons are held there in second hands, all of which tends to a depression which is unusual and may be only temporary. In any case, a point appears to have been reached in this market from which prices are not likely to be subject to change, except in sympathy with changes at other points. The imports of foreign iron have again rather a formidable appearance, the shipments from Great Britain to the United States during the first four months of 1881 being upward of 250,000 tons, as follows: Pig Iron, 109,835 tons; old iron for remanufacture, 24,596 tons; unwrought steel, 24,536 tons; Rails of Iron or Steel, 87,430 tons; and about 15,000 tons of Hoops, Sheets, Angles, &c. A large portion of the Pig Iron—nearly all, in fact—has been bought, to arrive, by the Bessemer companies, but there is no denying the fact that American companies are suffering not only from the effects of the "boom," but in recent transactions a good deal of business has been sent abroad, which, at equal prices, it is claimed, domestic furnaces would have been glad to secure, and, if secured, would have placed the market in a very strong position. Under present circumstances, however, prices are feverish and weak, with but little prospect of improvement, although an enormous consumption appears to be secured beyond question. Transactions during the week have been in limited amounts, 500 or 1000-ton lots being inquired for, but not taken at rates named. Smaller lots of No. 1 Foundry have been taken at \$24 @ \$25, the latter quite an outside figure; No. 2 at \$21 @ \$22; Gray Forge at \$20.50 @ \$22. Offers for large lots are not easily obtained, but there is no doubt concessions would be granted on all descriptions. In the meantime, among consumers generally, the disposition appears to be in favor of holding off for further developments. Charcoal Iron is very dull at \$28 @ \$38, according to brand; the best makes command full prices.

Foreign Iron.—The chief interest of the market centers in Bessemer Iron. Sales have been made at about \$23, and still lower figures were accepted for lots from second hands. Some large transactions are under negotiation, and will probably be closed in a day or two at about \$23 for shipment. Arrivals during the last month were about 50,000 tons, and sales during the past 30 days indicate that almost equally large amounts may be expected during the summer months. Scotch Iron is entirely neglected; Eglinton offered at \$21; other brands at \$22 @ \$23, without finding buyers.

Muck Bars.—The demand is active, and although holders are very firm, it has been found impossible to realize any general advance. For best quality \$38.50 at mill is asked, with numerous sales at \$38 @ \$38.50, according to quantity called for.

Blooms.—A very active business is reported, one sale of 300 tons being reported at \$60 at forge. We quote as follows: Cold-blast Charcoal, \$62.50 @ \$65; Run-out Anthracite, \$55; Scrap Blooms, \$45 @ \$47.50.

Bar Iron.—There is a good demand at unchanged prices—say, 2 1/2 @ 2 3/4 for large lots and 2 1/4 @ 2 1/2 for smaller quantities. The satisfactory arrangement as regards labor in the Western mills is likely to have a good effect, and an unusually large trade is anticipated after midsummer. In the meantime no heavy transactions are looked for, but the current demand keeps the mills steadily employed. It is hoped there will be an improvement in prices, but the outlook is not sufficiently settled to warrant very confident predictions in that respect. A slight decline in material, however, may compensate somewhat, the margin for profit of late having been entirely too small, and lower cost or higher selling prices are ardently desired.

Structural Iron.—The week has developed no new features, unless it may be a shade more firmness in prices. The market is not by any means active, but there is a large amount of business doing, notwithstanding the apparent indifference of buyers. Work has been steadily accumulating at mills, and there is a larger amount of orders on the books than there has been for many weeks past. Consumption at leading establishments is maintained without interruption, with every prospect of its continuance, so that there is a growing impression that cutting in prices to secure business is unnecessary. Under these circumstances quotations are steady and unchanged—say, 2 1/2 for Angles, 3 for Tees, 3 1/2 for Beams and 3 1/4 for Channels.

Plate and Tank Irons.—A fair week's business has been done, as a rule leaving manufacturers in a better position than they have been for some time past. Prices are irregular, and a few complain that they are running short of orders, but, as we have said, the tendency is toward improvement in both price and demand. Some good-sized and desirable contracts have been taken at concessions from quoted rates, but there are equally as many who would not look at an order unless at a decided advance. Ordinarily quotations are about the same as last week, viz.: 2 1/2 for Tank; Refined Iron, 3 1/2; Shell, 3 1/2; Flange, 4 1/2 @ 4 1/2; Fire-box, 5 1/2 @ 5 1/2.

Sheet Iron.—There is no change to note; demand fair, and mills fully employed on former orders. Prices are unchanged as follows:

Common Sheet, No. 26 to 28.....	4 1/2
Common Sheet, No. 22 to 25.....	4 1/2
Common Sheet, No. 10 to 21.....	3 1/2
Best Refined 1/2 @ 1/2 advance on the above.	
Best Bloom Sheets, No. 26 to 28.....	6 1/2
Best Bloom Sheets, No. 22 to 25.....	6 1/2
Best Bloom Sheets, No. 10 to 21.....	5 1/2

Common Red Plates, 3-16 to 16.....	3 1/2
Blue Annealed, 3-16 to 16.....	3 1/2
Best Bloom Galvanized, discount.....	3 1/2
Second quality, discount.....	3 1/2

Steel Rails.—The market is active, but prices are lower. For almost any delivery about \$60 is quoted, although it is a little difficult to place orders for the next three months. Later deliveries are quoted from \$56 upward. A good deal of business has been done in English rails, chiefly for Southern ports. One sale of 10,000 tons 35's was closed a day or two ago, for shipment to Gulf port, at a price equal to about \$63. Heavier sections are quoted \$61.50 @ \$62.50 Gulf, or a shade lower to Atlantic Ports.

Iron Rails.—There are a good many inquiries for Iron Rails, but very few orders have been entered, the mills being fully employed on previous contracts. The Oregon Railway and Navigation Company have several Pennsylvania mills at work on their 20,000-ton order, and are reported to be in readiness to make further purchases, soon as manufacturers can accommodate them. There is no doubt whatever that the mills will have all the business they can manage during the summer months, and have also fair prospects until the close of the year. Heavy sections are quoted at \$46.50 at mill, and \$47.50 @ \$50 for 35's and lighter patterns.

Old Rails.—The market is exceedingly dull, and to effect sales holders are compelled to make concessions. A lot of 400 tons brought \$26.25, delivered to cars, and \$26 in store to \$26.50 on cars or for shipment, appear to be the ruling rates, although it is not always possible to find an immediate buyer at these or even slightly lower prices. Stocks have been reduced considerably, and foreign advice are said to be more favorable, but the market here looks weak and fails to respond to any demand for an advance.

Crop Ends.—A cargo sold this week at \$27 ex ship, but there is no general demand, and sellers would probably find it difficult to duplicate the transaction.

Scrap Iron.—The market is exceedingly dull, and it is difficult to make quotations with entire accuracy. Wrought rules from \$26 for short up to \$29 for choice selections, Cast at about \$19.

Nails.—There is a good demand, and with light stock prices are firmly maintained at \$3.15, less the usual trade discount.

PITTSBURGH.

Office of The Iron Age, 77 Fourth Avenue,
PITTSBURGH, PA., May 31, 1881.

The most serious matter our manufacturers have to contend with at the present time is that of labor, and strikes of some kind or other are of almost daily occurrence. As a rule, manufacturers, not only here but elsewhere, are willing to pay their workmen living wages, but in some branches of business the price paid for skilled labor is out of all proportion, and the manufacturer cannot pay it and meet competition. This is the situation as regards one of our most important interests, that of window glass, at the present time. It is admitted by all who are cognizant of the business that the manufacturers of this article, if they accepted the prices they are able to obtain, would not more than obtain actual cost, and, as it is probable a reduction will be asked by the manufacturers, a strike is not improbable, as the workers are not likely to give in without a struggle. It is apprehended that the Coke workers will demand an advance some of these days, and while the Iron manufacturers are likely to sign the scale presented by the Amalgamated Iron Association, it is not by any means satisfactory to them. The Coal miners have been quiet for some time past, but they know that it would be useless to strike now with navigation suspended. The printers' strike is the latest, but it was of short duration, and, while in some instances it was successful, in others it was not.

Pig Iron.—The market has again relaxed into the quietude noted for two months preceding week before last, when, as stated in our last report, there was an unlooked-for movement, several round-lot sales having been effected. There is, however, a better feeling apparent on the part of furnacemen, the most of whom are confident that a more active market is only a question of a little time. While some mill owners claim to have considerable stock, it is admitted that stocks in mill yards generally are pretty well run down, and that they will soon have to be replenished. Moreover, it is also the opinion of consumers, as a rule, that prices of Pig Iron are not likely to go much, if any, lower, and there is a possibility, if not a probability, of an advance; and this being the case, it will be seen that another spur is liable to take place almost any day. We hear of one firm having bought a line recently, running throughout the year, which they would not have done if they had entertained the belief in cheaper Pig Iron. Furnacemen say that rather than submit to lower prices they will blow out; that current rates afford a very small margin, and consumers generally appear to take it for granted that there is some truth in the statement. It is also worthy of mention that there is less fear of foreign competition than heretofore on the part of furnacemen reports, in view of the more favorable reports from across the water. There has been an increasing demand for Foundry Irons for some time past; the foundries are nearly all reported very busy, some of them having large contracts, and while there has been no improvement in the price of Foundry grades as yet, sellers are hopeful that there soon will be. We repeat former quotations: Native Ore Forge, \$21.50 @ \$22.50, 4 mos.; Foundry, \$22.50 @ \$23 for No. 2 and \$24 @ \$24.50 for No. 1; Lake Ore Irons—\$22 @ \$23, 4 mos.; for Neutral Forge, \$24 @ \$25 for Red-short Cinder Mixture, and \$26 @ \$27 for all Ore ditto; Foundry grades, \$23 @ \$23.50 for No. 2 and \$24.50 @ \$25 for No. 1. Bessemer continues very quiet; we hear of an occasional small sale for foundry use at \$28 @ \$28.50, 4 mos., for No. 1. Nothing doing in Charcoal Irons excepting an occasional sale of 30 to 50-ton lots of Eastern Cold-blast at \$38 @ \$39.

Manufactured Iron.—While there is no general improvement to report, orders have commenced to come forward more freely

and there is a firmer feeling in regard to prices. Manufacturers can see no way to reduce cost of production; if anything, the tendency is in the opposite direction, and this being the case they have resolved to have better prices; hence there are but few sellers now at bottom rates, and a general disinclination to contract for future delivery prevails. The consumption throughout the West, already large, is still increasing, and an unusually active trade this summer is looked for. Never in the history of the country have the railroads been as large consumers as at present, and this will continue until the close of the year. We repeat former quotations: Merchant Bars, \$2.15 @ \$2.25 rates, 60 days, 2 per cent. off for cash; Sheet, \$3.65 @ \$3.70 for No. 24; Tank, \$2.70 @ \$2.75; best brands of Boiler Plates, \$5.50.

Nails.—There has been very little change in the situation since our last report. Business continues backward for the season, but it is improving nevertheless, and prices are ruling steady at \$2.85 @ \$2.90, net cash, for carload lots and upward. There is a very fair stock in first hands, but jobbers, there is reason to believe, are not as well supplied as ordinarily at this season of the year, some of them holding off in expectation of lower prices; but with a large consumption assured, an increased business is only a question of a little time. The feeling among manufacturers in regard to prices is more confident, and it is questionable whether large contracts could be made for future delivery at our quotations.

Wrought Iron Pipe.—There is an increasing business, and the prospect for an active summer trade never was better. Thus far the spring business has been less than that of last year, and prices have been unsatisfactory to makers, but with an increasing demand better prices soon are not improbable. We continue to quote the discount on Gas and Steam Pipe at 6 1/2 % @ 7 %; Boiler Tubes, 45 % @ 50 %. The net price of Oil-well Casing remains unchanged at 70¢ per foot, and do. Tubing at 21¢ per foot.

Railway Supplies.—As there have been no sales of Steel Rails reported for some time, we omit quotations. Spikes remain unchanged at 2 1/4 ¢, 30 days; Splice Bars, 2.35¢ @ 2.50¢; Track Bolts, 3 1/2 ¢ @ 4 ¢.

Steel.—The demand for all kinds of merchant steel continues backward for the season, but the outlook is favorable for a good summer trade. There is considerable cutting in the commoner grades, but the finer qualities are still holding their own. We repeat former quotations: 1st quality of Refined Cast Steel, 11¢; ditto Crucible Machinery, 7¢; Bessemer and Open-hearth Machinery, 5¢ @ 5 1/2 ¢; ditto Spring, 4¢ @ 4 1/2 ¢; ditto Plow, 4 1/4 ¢ @ 4 1/2 ¢.

Scrap.—Dealers generally report business as quiet, but unchanged in price. We repeat former quotations. No. 1 Wrought, \$29 @ \$31 per net ton; Old Car Axles, \$36 @ \$38; Old Car Springs, \$40 @ \$42; No. 1 Turnings, \$22 @ \$23; Boiler Iron, \$29 @ \$30; Steel Crop Ends, \$29 @ \$30, gross; Old Car Wheels, \$30 @ \$32, gross; No. 1 Machinery Metal, \$22 @ \$23, gross; Cast Borings, \$16 @ \$17, gross.

Coke.—Demand keeps up well and equal to the production, which is larger than ever before. Prices are quoted steady at \$1.65 per ton, free on cars at ovens. Rumors prevail, more or less, of a contemplated strike in the Connellsville region, but it is not believed in well-informed circles.

Window Glass.—According to agreement the factories will blow out to-day, and remain so until the 1st of September. The suspension this year will be three instead of two months, as formerly. It was agreed by all manufacturers in the association to stop for three months, and, while some of them may work on for a week or two, yet, if so, they will not start up for a week or two after the others in September. It is reported, on seemingly good authority, that a reduction of 20 % will be demanded in the wages of all skilled workmen, and if so a lockout is not improbable. Manufacturers claim that they cannot pay present wages and compete with foreign glass. Discounts are still quoted at 70 % on Single and 75 on Double strength.

CHATTANOOGA.

Office of The Iron Age, Market and 8th Sts.,
CHATTANOOGA, May 30, 1881.

The dullness in trade reported for the two previous weeks has characterized the one just closed. In most articles there is little doing except to fill orders already booked. Nothing of consequence is coming in, but old contracts so far serve to keep all the manufacturers fairly full of work, and will for some time. Manufacturers and dealers all look forward to an active trade in heavy articles to open about the 1st of August. A good many of the contracts for dealers' supplies will fall in along about that time, and as the present consumption serves to keep stocks down to safe dimensions, it is argued that trade must then begin to revive. The crop prospects being also excellent, stimulate hope of a good autumn business. The weather for the week has been fine, with good showers, closing quite warm.

Pig Iron.—There is no change. Purchases are for present use only. None of the consumers buy ahead. We quote: No. 1 Foundry, \$22 @ \$24; No. 2 Foundry, \$20 @ \$21; Gray Forge, \$18 @ \$19; White and Mottled, \$16 @ \$18; Car-wheel Metal, \$38 @ \$40.

Ores.—We quote: 50 % Brown Hematite, per ton, \$2 @ \$2.75; Red Fossil, \$2 @ \$2.25.

Miscellaneous Articles.—We quote: Old Rails, nominal at \$26 @ \$28; Wrought Scrap, \$20 @ \$25; Cast Scrap, \$10 @ \$15; Old Wheels, \$28 @ \$30.

Nails.—We quote Nails at \$3.10, nominal. Sales are made at 10¢ @ 15¢ below this for considerable lots.

Manufactured Iron.—Bar Iron continues rather slow, though the market holds up better than was expected of it early in the spring. Track supplies have a steady market. We quote Bars at \$2.25 rates; Spikes, \$3.15; Track Bolts, \$4; Trestle Bolts, \$4.50; Fish Plate, \$2.50.

Coal.—We quote run of mine, \$2 per net ton, with a full supply offering.

Coke.—We quote: Furnace Coke, \$3 per ton at furnace; Foundry, 10¢ @ 12¢ per bushel.

Steel and Iron Rails.—Steel Bars, \$62 at mill; Iron, \$50 @ \$52; Small, \$57 @ \$60.

BOSTON.

May 28.—There is nominally no change in the iron market, and its tone is weak and somewhat unsettled. Consumers are still holding out of the market, and appear disposed to use up all of their old stocks before making any new purchases. Yet there are not lacking many indications at the present time that bottom prices have been touched, and that values will certainly rule no lower in the immediate future than they are at present. With the present cost of ore and labor and fuel, there is no margin either for furnace or mill men at to-day's prices of iron. The labor troubles which are arising in all sections render any decrease of expense in that direction improbable. Nor is there any expectation of lower prices of ore. Iron could hardly go any lower at present, therefore, without leading to such a diminution of production as would be speedily followed by an advance in prices.

We quote American Pig Iron at \$24 for No. 1 X; \$21 @ \$22 for No. 2 X, and \$19 @ \$20 for Gray Forge. These prices are f. o. b. at the port of shipment. Small spot lots will command \$2 1/2 ¢ higher. Foreign Pig has ruled quiet and steady at our last quotations.

We quote Coltness and Langloan at \$23.50; Glengarnock and Gartsherrie at \$22.50; Carnbroe at \$21.50; Eglinton at \$20.50 @ \$21; and Middlebrook ("Clarence") at \$17.50 for No. 3, and \$19 @ \$19.50 for No. 1. Old Rails are in moderate demand at \$29 for American and \$26 @ \$27.50 for Foreign. Manufactured Iron is in moderate demand at about the same prices as last noted, and without much actual improvement, yet prices show a hardening tendency. There is even less profit on Bar Iron to-day than on Pig, and Eastern mills as well as Western are suffering to some extent from labor troubles, the Fall River Iron Works having been reported unable to fill orders from this cause the present week. Refined Bars are selling at \$23.25. Swedish or Norway is unchanged at \$3.75 for Bars and \$4.75 for Shapes. Plate Iron is steady at \$2.75 for Common and Tank; \$3 for C. No. 1; \$3.40 for C. H. No. 1 Shell, and \$4.40 for C. H. No. 1 Flange. Nails are quoted at \$3.05 @ \$3.15, net. Boiler Tubes are selling at 50¢ off, though the advertised discount is 45 %. The Boston store prices of Steel are as follows: Best English Cast, 14¢ @ 14 1/2 ¢; American ditto, 12¢ @ 12 1/2 ¢; Bessemer Machinery, 5¢ @ 6¢; Crucible ditto, 7¢ @ 7 1/2 ¢; Wedge and German, 7¢; English Spring and Calking, 7¢ @ 7 1/2 ¢; American Spring and Calking, 5¢ @ 5 1/2 ¢; Tire, 3 1/2 ¢ @ 3 3/4 ¢; Sleigh Shoe, 3¢ @ 3 1/2 ¢. Copper is dull and unchanged, with a nominal quotation of 18 1/2 ¢. Buyers are all holding off, and the prevalent distrustfulness is heightened in some measure by reports of large accumulations of Ingot Copper all ready for shipment from mines in Arizona and New Mexico, as soon as the railroads, which are now in process of construction, reach there. These reports, however, have less effect than they otherwise would, because of the general recollection that similar stories were told two or three years in regard to Lead in Leadville. It was predicted that when the railroads should reach Leadville, such enormous aggregations of the metal from which the town derived its name would be thrown upon the market that prices would thenceforward rule as low as 2¢ per pound. But the fact has been that Lead has averaged 4 1/2 ¢ @ 5¢ 1/2 ¢ lb ever since railroad communication with Leadville was opened. We are unable to find any actual consumers of Copper who are willing to operate in expectation of a decline below 18¢ 1/2 ¢ lb. It is said that the details of the export movement of Lake Copper have now been agreed upon, and the amount to be shipped is 8,000,000 pounds, guarantee being given that the copper shall not again be brought back to the United States. The price is said to be equal to \$72 10¢ with 2 1/2 % per cent. discount, delivered at Continental ports. This price indicates the superior esteem in which American Copper is held, since Chili Bars were selling at the same time in London at £58. 10/, and English best selected at £65.

There has been no change in the combination prices of Manufactured Copper. We quote: New Sheathing Copper at 20¢; Braziers, 25¢; and Bolts, 25¢; Bottoms, 31¢; American Yellow Sheathing Metal, 17¢ @ 18¢; Yellow Metal Bolts, 20¢, and English Yellow Metal Sheathing, 14¢, in bond. Lead has weakened again, and we cannot quote over 4 1/4 ¢ @ 4 1/2 ¢ for round lots, and 4 1/2 ¢ @ 4 3/4 ¢ for smaller parcels. The prices of manufactured are unchanged, as follows: Bar, 6 1/2 ¢; Pipe, 6 1/2 ¢; Sheet, 7¢; Tin-lined Pipe, 15¢; Tin Pipe, 40¢, all less 10 % to the trade. No. 1 Solder, 11 1/2 ¢. Spelter continues dull and unchanged, and we quote \$5.05 by the carload for Western and 4 1/2 ¢ for remelted. Small lots bring 1/2 ¢ above these figures. Sheet Zinc is in good demand at 7¢ @ 7 1/4 ¢. Tin is dull and weak, and the tone of the market irregular and unsettled. Straits and English are obtainable at 10 1/2 ¢, and a still lower figure is possible. Tin Plates are moving slowly, and prices are in buyers' favor on all grades except large Ternes. The position of the producing markets

No. 1 Hanging Rock, Stonecoal and Coke	23.50 @ 24.00
No. 2 Hanging Rock, Stonecoal and Coke	22.50 @ 23.00
No. 3 Southern, Stonecoal and Coke	23.00 @ 24.00
No. 4 " " " "	23.00 @ 24.00
"American Scotch" " "	22.50 @ 23.50
Silver Gray " "	20.50 @ 22.50
Scotch " "	24.00 @ 25.00

MILL IRONS.

No. 1 Charcoal, Cold-short and Neutral	22.00 @ 23.00
No. 2 Stonecoal and Coke, Cold-short and Neutral	21.00 @ 21.50
No. 3 Stonecoal and Coke, Cold-short and Neutral	20.00 @ 20.50
No. 4 Missouri and Indiana Red-short	20.50 @ 21.00
White and Mottled, Cold-short and Neutral	17.00 @ 19.00

CAR WHEEL AND MALLEABLE IRONS.

Hanging Rock, Cold-blast	35.00 @ 41.00
Alabama and Georgia, Cold-blast	35.00 @ 40.00
Kentucky, Cold-blast	35.00 @ 40.00

W. B. BELKNAP & Co., Iron and Steel Merchants, Nos. 113 and 115 Main street, report to us as follows, under date of May 28: There is a decided improvement manifest in Bar Iron; and while prices are hardly quotable higher for immediate specifications, delivery at mills' convenience, it is impossible to place orders for July and August deliveries at less than \$2 7/8 ton advance. With a superabundance of money seeking investment, and lending at an unprecedented low rate of interest, it would indeed be strange if Iron failed to profit by it and sympathize with the general prosperity. There is an immense amount of Iron going now into immediate use, and the impression prevails that by July this large consumption must tell upon the market. Light Sheet is very firm. Heavy Sheet is low, but in good request. Nails still slow. There has been little confidence in Nails during the whole season, some parties having overbought keep our market demoralized. Seasonable goods, wheels, wheelbarrows, &c., are scarce.

ST. LOUIS.

Messrs. HOFFER, PLUMB & Co., Pig Iron and Iron Ore Merchants, 417 Pine street, write as follows, under date of May 28: There is no change in the market here; iron is still dull and quiet. We continue to quote:

HOT BLAST CHARCOAL.

Missouri	27.00 @ 28.00
Southern	25.00 @ 26.00
Ohio	25.00 @ 26.00

COKE AND COAL.

Missouri	26.50 @ 27.00
Southern	24.00 @ 25.00
Ohio	24.00 @ 25.00

MILL IRONS.

Cold-short	21.00 @ 23.00
Red-short	25.00 @ 26.00

CAR WHEEL AND MALLEABLE IRONS.

Missouri	31.00 @ 32.00
Southern	28.00 @ 29.00
Ohio	35.00 @ 42.00

BALTIMORE.

W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, reports us the following, under date of May 30: Trade rules about the same as last reported, with prices adhered to, as per annexed list.

Ref. Bar Iron, 1 to 2 1/2 x 1/2 to 1 1/2 x 1/2	22 1/2 @ 23 1/2
" " 1 to 1 1/2 x 1/2 to 1 1/2 x 1/2	22 1/2 @ 23 1/2
" " 1/2 to 1/2 x 1/2 to 1/2 x 1/2	22 1/2 @ 23 1/2
and Square	2 1/2 @ 2 1/2
Band Iron, 1 1/2 wide and upward	2 1/2 @ 2 1/2
Band Iron, from 1 1/2 to 4 in. wide	2 1/2 @ 2 1/2
Horse-shoe Iron	2 1/2 @ 2 1/2
Norway Nail Rods	2 1/2 @ 2 1/2
Black Diamond Cast Steel	12 1/2 @ 14 1/2
Machinery Steel	9 @ 9 1/2
Cast Spring Steel	9 @ 9 1/2
Common Horse Nails	10 @ 14 1/2
Perkins' Horse shoes, 1/2 keg of 100 lbs.	4.37 1/2
" Mule shoes	5.37 1/2

RICHMOND.

Mr. ASA SNYDER, Iron Merchant and Furnace Agent, writes as follows under date of May 30: The values attached to the articles scheduled below fairly represent this market:

Scotch Pig Iron	23.00 @ 27.00
No. 1 Anthracite ditto	22.00 @ 25.00
No. 2 " "	20.00 @ 23.00
No. 3 " "	19.00 @ 22.00
No. 1 Virginia Coke Pig Iron	23.00 @ 24.00
No. 2 " "	22.00 @ 23.00
No. 3 " "	21.00 @ 22.00
Virginia Charcoal C. B. Wheel Iron	35.00 @ 37.00
Old Ralls	26.00 @ 27.00
Wrought Scrap, No. 1	22.00 @ 24.00
Cast Machinery Scrap	19.00 @ 20.00
Richmond Refined Bar Iron	22.00 @ 23.00
Horse Shoes, Tredgegar	4.00
Mule	5.00
Freight to New York, by rail, \$1.75 for 2240 lbs.	

CINCINNATI.

MAY 30, 1881.—Pig Iron.—The demand for all grades except Forge Irons has been fairly good during the past week, the output having been largely of Virginia, Tennessee, Alabama and Georgia foundry grades on old and new orders. The necessities to realize on present stocks on the part of some parties, and the disposition on the part of others, not makers, to close out their old purchases, has weakened the market somewhat for certain low and middle grades, both C. C. and S. C. kinds. The outlook is on a large constant demand for consumption, and at steady prices. Sales during the past week were at from \$26 50 @ \$27.50 for good to best No. 1 H. R. C. C. Foundry; \$23.50 @ \$24 for No. 1 Coke; \$23 @ 23.50 for No. 1 Bituminous; No. 1 Silver Gray Softeners, \$21.50 @ \$22; No. 2, \$20.50 @ \$21; No. 3, \$19.50 @ \$20; Machinery, \$20 @ \$21.50; Warm Blast C. C. Hanging Rock Charcoal, \$26.50 @ \$30; Cold blast, \$35 @ \$38; Wrought Scrap, \$1.10 @ \$1.50; Cast, \$50¢ @ 80¢; Scrap Wheels, \$31.50 @ \$32.50.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

LONDON, ENGL., May 16, 1881.

THE POSITION

of the iron trade and its nearest allies has not undergone any improvement during the week; indeed, the current quotations for several items are decidedly below those given in my last week's letter. This is especially true as regards Scotch pig iron,

which is about 2/ below the quotations of seven days ago. There is no need to search for the cause of this downward change. It is all too plain to those who are interested in the matter, and needs no further elucidation or explanation. The production is quite as heavy as heretofore, and the consumption being proportionately small, it follows that stocks must grow. They are increasing with a vengeance, and will continue to do so under existing conditions. No sign has yet been given of any wish or intention to restrict the production, but that there is some uneasiness in the Glasgow "ring" would appear from the fact that a meeting has been called for this afternoon, for the purpose of considering the advisability of forming a new and more exclusive "circle" for the more effective manipulation of the business. You are aware, of course, that the members of the iron ring at Glasgow are not necessarily ironmasters, but you may safely assume that the two bodies are so closely allied and their interests are sufficiently identical to warrant no step on the one side without a certain amount of "parallelism" on the other. The movement may be taken to mean, I think, that there is an undercurrent of dissatisfaction which the alterations are proposed to eliminate. At first sight some of the new rules would appear to be framed in order to prevent, or at all events limit, speculation on the part of the outside public, but in reality that can scarcely be the intention of the gude men o' Glasgow, whose only motive may be interpreted as desiring to bring all transactions into the proper channels—that is to say, themselves. With far higher interest and satisfaction the members of the trade would like to see some solid movement for the limitation of the make, the enormous reserve stocks in Scotland being a standing menace and source of danger to the iron trade of the whole world. In the Cleveland district the question of blowing out furnaces is mooted, but it is proposed to allow a little more time to elapse prior to putting the idea into operation. Even in that most favored locality of Great Britain matters are very quiet, and the demand is still below the capabilities of the supply. The shipping season has commenced, but so far the tonnage moved is below the mark, Russia being a conspicuously small buyer, probably owing to her internal troubles as well as to the incidence of the new tariff. On the West Coast hematites are quiet, the producers there having lately found the competition of the Scotch, Cleveland and Wigan hematite smelters formidable and troublesome. In South Yorkshire six blast furnaces have been damped down—four at the Elsecar Works of Dawes & Co., owing to the dullness of trade, and two at Tinsley, near Sheffield, by reason of the failure of W. J. Roseby, whose debts are stated to be £100,000.

In South Staffordshire the smelters are a dying race of men, and represent that there are not more than two or three of them who are enabled to make a living profit. Of their 145 or so furnaces, only about 41 are blowing, or a little over 30 per cent. of the whole number. Elsewhere all things are dull and spiritless, neither crude nor finished iron showing the least signs of life. What may happen within the next few months one cannot venture to forecast, but it is plain that in the absence of any revival of business we shall almost certainly witness a state of collapse of greater severity than we have known for many years past. Some vague and impersonal writer who is quoted by the *Times* informs us that although pig iron is in a bad way, yet finished iron is more cheerful; but in the absence of chapter and verse it is but human to doubt the assertion, since experience and observation alike condemn its statements and inferences. The general idea is that we shall have no change of any moment this side of midsummer, whatever may happen toward the autumnal equinox, and not then unless the harvest proves a far better one all over the country than its two or three immediate predecessors. Our weather has been very fine and dry for months—indeed, we are beginning to cry out for rain, which (if we get it) would inevitably prove our bane. We have so far "perfected" our drainage systems that a few hours of heavy rain flood all the low lying localities and place large tracts of country under water.

THE FRENCH TARIFF

is proving a sore stumbling block in the path of many good men and true who have hitherto sworn by free trade. The French government having at length given notice of their intention to abrogate the Commercial Treaty six months hence, frantic efforts are being made to induce our neighbors to enter into further engagements. The "bosses" of the Gallic republic seem to be quite averse to making any exception in our favor, and the best efforts of our Foreign Office, aided by *poupartiers* in either country, have been fruitless. Under the new general tariff which will come into operation on November 8th next, unless something very improbable be settled in the meantime, our woolen, cotton and other textile goods will have to pay enormously augmented duties, some of the changes being equal to advances of 200 to 300 per cent. The principle of ad valorem is mostly abandoned for specific duties, which will virtually close the French markets from Bradford, Leeds, Manchester, &c., manufacturers. On iron and steel the direct charges are rather favorable so far as they go; but on hardware the increases are very heavy indeed. Under these trying circumstances the Chambers of Commerce and many other bodies of equal status have sounded the tocsin and have passed resolutions denouncing the retrogression of France from the paths of fiscal rectitude. Rather than allow France to take an additional "rise" of an average 24 per cent. out of us, they declare we should decline further negotiations for a Continental treaty, and stand or fall under the general tariff. In taking this view of the question those concerned show fair common sense, although their line of action affords many grains of comfort and consolation to the devoted few who have always denounced the 1872 treaty as a one-sided bargain to our disadvantage. The new view also demonstrates the utter futility of the "universal free trade" crusade commenced by Cobden and carried on by the clubbists of that ilk. The whole thing, in fact, is shown

to be a mere matter of bargaining, in which, if we play our cards properly, we are certain to come off "there or thereabouts" first chop.

SCOTCH PIG IRON

has declined on the week and is now lower all round. Warrants are quite 2/ below my last mail figures, and makers' brands are 1/ or so cheaper. There are 122 furnaces blowing in Scotland (including 6 on hematites), against 114 same date 1880. In Connal's stores there are 556,448 tons—an increase for the week of 3702 tons, as compared with 441,471 tons same date last year, and 495,850 tons at Christmas last. Makers' own stocks are proportionately heavy. To date this year shipments have decreased 109,105 tons, on a total this year of 179,972 tons. The importations of Cleveland pig into Scotland have increased by 21,707 tons, on a total of 102,807 tons to date, 1881. Ballast pig iron is quoted 43/ per ton alongside ship in Forth or Clyde. Writing from Glasgow on May 13 James Watson & Co. said: The Scotch iron market has further receded considerably in price, owing to the unfavorable Board of Trade returns and small shipments, these combined causing holders to realize. A large speculative business has been done in warrants but maker's iron has been neglected. On Monday the market was flat with business from 46/10 to 46/8, cash, and on Tuesday the price declined to 46/4 per ton. On Wednesday the market gave way to 45/9 per ton, and yesterday forenoon as low as 44/5 1/2 was accepted, rallying in the afternoon to 45/9 per ton. To-day the market opened firm at 45/10 1/2, then receded to 45/9, closing buyers at 45/9 1/2, sellers at 45/10 per ton. The shipments last week were 9461 tons, as compared with 17,799 tons for the corresponding week of last year. We quote:

G. M. B., at Glasgow	No. 1.	No. 2.
Garscherrie	47/	45/
Coltness	46/6	44/6
Summerhall	45/6	43/6
Langloan	45/	43/
Carnbroe	45/6	43/6
Calder	45/6	43/6
Glenarnock, at Ardrossan	45/	43/
Edinburgh	47/	45/
Dalmellington	47/	45/
Shotts, at Leith	47/	45/
Kinnell, at Bo'ness	47/6	45/6
Carroll, at Grangemouth	45/6	43/6

CLEVELAND PIG IRON

has felt the depressing influence of the Glasgow market, and are quiet at the following figures for G. M. B., net cash, makers' wharves in Tees:

No. 1 Foundry	No. 2 Foundry	No. 3 Foundry
1	47/	45/
2	46/	44/
3	45/	43/
4 Forge	46/3	44/3

The local ironworks are fairly employed, but there is no activity. At the Eston works of Bolekew, Vaughan & Co. about one-fourth of the steel made is from common pig, dephosphorized. Another rail mill has been started, making the product of rails 3000 tons weekly. Two other works for the Thomas Gilchrist process are projected in the district.

WEST COAST HEMATITES

are dull at the subjoined rates, which are for ordinary parcels only:

No. 1.	No. 2.	No. 3.
Cleator	65/	63/
Lonsdale	58/	56/
Workington	58/	56/
West Cumberland	58/	56/
Lowther	58/	56/
Moss Bay	58/	56/
Harrington	58/	56/
Solway	58/	56/
Maryport	58/	56/

THE CENSUS.

so far as the returns have been completed, show one cardinal result, which affords new and startling evidence of the decadence of British agriculture. In almost every part of the country the villages and rural parishes have decreased in population during the past decade, the falling off being nearly universal in those districts where farming is the only pursuit of the inhabitants. Scarcely any additional new houses have been erected during the 10 years, and many of the old ones stand empty. Villages of 2000 or so inhabitants have decreased to 25 per cent. within the period, with a singular unanimity which is not capable of a ready explanation. The diminution has certainly not been caused by any general absorption of small farms by large owners—indeed, the tendency of the times is pointedly in the other direction, a sort of *petite culture* being much favored by a section of our political schemers. The fact seems to be that the young bucolics have forsaken the plow and have either emigrated to other lands or have migrated to the mining or manufacturing districts. Had trade been brisk one could have readily understood the change, but it is not explicable with ease when it is borne in mind that for some years past a minimum of labor has been employed in coal mining, iron working, &c. Where, then, have the farmers gone? All the large towns seem to have increased in population—some of them very materially—but as all the returns are not yet issued I defer more detailed allusion to them. It is much to be regretted that no special iron trade census has been carried out, as has been the case with you. While on this I may appropriately allude to the subject of

EMIGRATION.

which is just now on an unprecedentedly heavy scale from and through this country. At no former period has the westward swarm of human beings been so busy, chiefly from the northern and central districts of Europe. Our own people send a fair proportion of the emigrants, but they are only a limited percentage as compared with the Scandinavian and Teutonic hosts. The Liverpool steamship companies have a difficulty in dealing with the living tide which pours in upon them, and are dispatching vessels as rapidly as they can be manned and made ready for sea. On Wednesday last the Cunard Company sent the *Aleppo* direct to New York with 300 Scandinavian emigrants, and the *Atlas*, to Boston, with 700 Norwegians and Swedes and 200 Irish from Queenstown. On Saturday the Cunard liner *Bothnia* took 700 to 800 emigrants and ordinary passengers for New York, and the *Samaria*, with about an equal number of emigrants only. On Wednesday next the national steamer *England* will take a further large number of emigrants, and it is evident

that other vessels will follow, as special trains with Germans and Scandinavians are being run daily between Hull or Grimsby and Liverpool. During the month of April the number of ships that left Liverpool was 95, with 35,640 passengers, an increase of 21,161 over the emigration of the previous month, and of 6149 as compared with April last year. Of the past month's emigrants, 10,950 were English, 208 Scotch, 4282 Irish, 18,555 foreigners, and the nationalities of the remaining 255 were not given. The destinations of the passengers were as follows: To the United States, 31,782; British North America, 3500; Australia, 13; South America, 180; East Indies, 93; West Indies, 16; China, 4, and the West Coast of Africa, 43. There is much food for thought on these returns. One thing which is very striking is the strong preference shown for the United States. Canada obtains a small share of the migration, but from Liverpool, at all events, the proportion accorded to Australia, New Zealand and South Africa is absolutely infinitesimal. This, I infer, mostly arises from the fact that London and not the Mersey port is the point of departure for these Colonies, which undoubtedly obtain a fair share of the "Removers." Political economists are much exercised about this emigration, not so much per se, as in respect of its collateral and ultimate issues. They profess to see in the heterogeneous conglomeration of nationalities under your flag the germs of future troubles, their belief being that with such enormous numbers of persons of different races, habits and languages, perfect assimilation will be impracticable if not impossible, and that, therefore, amalgamation will not be successfully attempted. They are agreed that your virgin soil affords a safety valve for the overworked, poorly fed and overtaxed masses of Europe, but they profess the ability to detect the little cloud in the far distance which portends the future storm. Whether these views are well founded or otherwise is relatively immaterial at the moment. As it stands, the spectacle is profoundly interesting. One could wish it to be made more so still by an enlarged emigration from Ireland, the factitious woes of which country offer the greatest possible obstruction to the legislative progress of the nation as a whole.

PRICES OF METALS, ETC.

A comparison of the following prices with the figures given by me for the same articles a month ago will show the course of our markets:

	Per ton.
Lead ore, picked, 1 cwt. kegs	18 00
Pig lead	14 10
Sheet lead	15 00
Lead pipe	15 00
" " lined inside	17 00
Lead encased tin pipe	31 00
Composition cast tubing	17 00
Lead wire, No. 12, 28/13 to 16	37 00
Hand leads, 28/ deep sea leads	20 00
Improved lead washers	28 00
Lead nails	50 00
Bar lead (3 lbs. and upwards)	114 00
Patent shot	17 00
Hardened shot	18 00
Tin in ingots	92 00
Plumbers' tin	46 00
Tinman's " "	56 00
Gen. red lead (orig. packages)	16 3
" Reduced No. 1 "	15 5
" " No. 2 "	14 00
" " No. 3 "	11 00
Glassmakers' red lead	18 00
Pure English flake litharge, 5-cwt. casks	17 00
Pure English powdered litharge	16 10
Good foreign flake litharge	16 10
" " powdered	18 00
Pale powder litharge	17 10
Orange lead, powdered	28 00
Dry white lead, 25 lb. casks	20 00
Genuine ground white lead	21 10
No. 1	19 10
No. 2	17 10
Sheet zinc, No. 3 upward	15 10
Zinc nails, 1 1/2 upward	22 10
Hard spelter	12 00
Remelted spelter	14 10

FOREIGN.

FRANCE.

(Moniteur des Interets Maternels.)

PARIS, May 15, 1881.—*Metals*.—The weather being tolerably good and crop prospects rather promising, a busy business in general, and in Metals in particular, has been developing normally; this has, nevertheless, not prevented a decline in the latter on too liberal offerings. Copper gave way 2.50 francs; we quote: Chili Bars, 152.50 @ 155; Ingots and Slabs, 160.50; Best Sheet, 165; and pure Corocoro Ore, 155. Tin has declined 2.50; we quote: Banca, 237.50; Billiton and Straits, 235; Australian, 236.25; and English, 237.50. Lead dropped 1 franc; we quote the same 35.50 @ 36.50. Spelter declined 1.50 francs; we quote the same 40.50 @ 41.50 francs per 100 kilos. The situation in general has undergone no change; it is on the whole a satisfactory one, but Drawn Wire and Wire Nails in the Haute-Marne have exhibited considerable weakness. The receipt and execution, as well as the deliveries, proceed throughout France with the utmost steadiness, and fresh commands have all the attention that can be given without crowding work overmuch. We quote: Merchant Iron, 15.55 francs; Structural ditto, 20.50 @ 24.50; Common Sheet, 24; and Boiler ditto, 35 francs per 100 kilos. Import into France has been: Ore, 150,866 tons; Pig Iron, 15,157; Merchant Iron, 8075; Steel, 121 tons; and Straits, 235; Australian, 236.25; and English, 237.50. Coal has remained moderately active at well sustained prices, particularly as regards Coal for industrial purposes.

BELGIUM.

(Revue Universelle.)

BRUSSELS, May 15, 1881.—*Iron*.—The position here is still one of uncertainty and hesitation; thus in spite of the fair amount of orders received by some privileged concerns, prices do not look up. On the other hand, rather more export orders have been received. The concerns doing well at present are the rolling mills, the steel works, and structural iron concerns. They have no reason to complain, for their profits seem to be satisfactory. We quote: No. 1 Merchant Iron, 12.50 francs per 100 kilos; Beams, 13.50; Sheet Iron 18; Affinage Pig, 5.50; Moulage ditto, 6.75; English Pig, 5.75; Steel rails 15.50 @ 16, and hoops 22 @ 23. On taking a general view of the situation it seems to us evident that it might be worse, and that we are approaching the summer months in pretty good condition at moderate prices holding out inducements to consumers both at home and abroad. Then there are tolerably good crop prospects in Europe, even in Russia, and should everything go on smoothly in this respect there will be some well-grounded hope that the fall trade will fully indemnify us for disappointments early in the year. Not that we expect any very extraordinary revival with the usual accompaniment of a speculative era; nor do we need such. All we want is a steady amount of activity at moderately remunerative prices which will be more acceptable than a season of excitement with the inevitable disastrous recoil on the heels of it by the time the cold winter season puts a stop to business. Coal is heavy. *Metals* are quiet. We quote: Copper, 150; Lead, 36.50; Tin, 235 @ 237.50; Spelter, 41.50, and Sheet Zinc 55 francs per 100 kilos.

RUSSIA.

(Borsenhalle.)

HAMBURG, May 17, 1881.—*Iron*.—Business in the line, we are informed from Dortmund, has been quiet during the week under review, consumers still holding back to a considerable extent, while dealers are trying to work off accumulated stocks, the dullness thus extending to articles which had hitherto moved off tolerably well. Pig Iron is still neglected, and it may take some time ere the same revives seriously. This lack of activity in the raw material is not attributable to the price, which seems low enough, but rather to a disposition to await further developments in England. Bessemer Pig, however, forms an exception, since the Steel works are in want of it. Spiegel-eisen is also better situated than common Pig Iron. Merchant Iron has to bear the brunt of the present lull, for consumers decline paying any further current rates, and the rolling mills will not unlikely be compelled to make some concessions. Steel Rail works are busy all along filling orders, while fresh ones are pouring in upon them still. Structural Iron is selling more readily, there being no weakening of the building demand, and the same may be said of heavy hardware. Wire is no more as active as it has been, nor could it be expected that the rush for it would continue indefinitely. Boiler Sheets are still in good request. As for machine shops, the leading ones are busy, while the contrary is the case with the less important establishments. *Metals* are, on the whole, inactive in this line. Lead is quiet and unaltered. We quote: English Pig, 16.50 @ 16.50 marks per 50 kilos, ditto Sheets, 16.50 @ 16.50; German Pig, 15.15 @ 15.20, and Spanish, 17.50 @ 17.80. Copper is unchanged; Dronheim Rouben Rosettes at 70 @ 71; Wallaroo Rocks, 71 @ 72; Electrotyping in slabs, 75, and English Refined Ingots, 67 @ 68. Tin is duller. We quote: Banca and Australian, 95; English, 94 @ 96. Spelter is without anything doing. We quote Silesian, 15.75 @ 16 marks, spot and to arrive.

HOLLAND.

(Koch & Vletterboom.)

ROTTERDAM, May 17, 1881.—*Tin*.—Merchandise of all sorts, including Tin, has been ill-sustained since the commencement of the year. Banca Tin, which on January 1 was worth 54.75 guilders per 50 kilos, now only brings 52.50. The general feeling in commercial circles is now, however, an improved one, and the future is looked forward to with greater confidence. Thus Banca Tin was dull early in the week at 52, and Billiton at 51.50, but since then matters have been looking up; 52c. advance was offered and declined, and nothing can be had now under 53 5/8 guilders Banca, and 52 Billiton, both on the spot. Lead.—June delivery of Stolberg has changed hands at 8.50 guilders the 50 kilos.

AUSTRIA.

(Austrian Trade Journal.)

VIENNA, May 15, 1881.—*Iron*.—Although the market has remained quiet during the week, it seems evident that confidence in the future has been awakened once more, and considerably so, for the spring demand which failed to manifest itself early in the season, now, after all, appears to come forward. In the first place, the Hungarian Parliament has sanctioned the arrangement with respect to the Pesth-Semlin Railroad, from which important orders will flow to the benefit of our railway material manufacturers, among which there will be 25,000 tons of Steel rails. Then there is the Ofen-Funkirchen line, also in Hungary, to be attended to. Consolidation of works in Austria is also making good headway; the same in Hungary, less so in Bohemia. Meanwhile, building all of a sudden takes a good start in Vienna, Pesth and the leading provincial cities. This leads to the usual demand for Structural Iron and Builders' Hardware. Austrian Hardware is furthermore moving off more actively in the direction of the Danubian principalities, Italy and Turkey. Prices have, nevertheless, not improved, but remain steady. Only a few articles in the iron branch have been more active during the week—thus, Pillars in particular. Goods in the Merchant Iron line, Rods in particular, are still neglected. Prices remain well supported. We quote: Pig Iron, 41 @ 52 florins per 100 lbs.; Merchant ditto, 40 @ 51; Sheet Iron, 44 @ 45, and Pillars 115 @ 116, at Vienna. *Metals* have not varied from our full quotations of the previous week, which we do not recapitulate.

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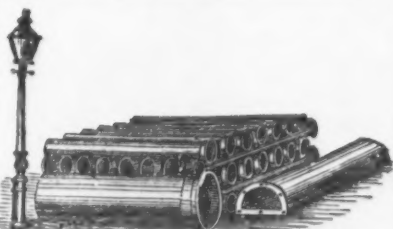
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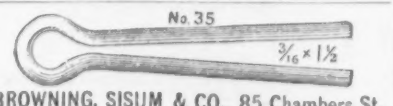
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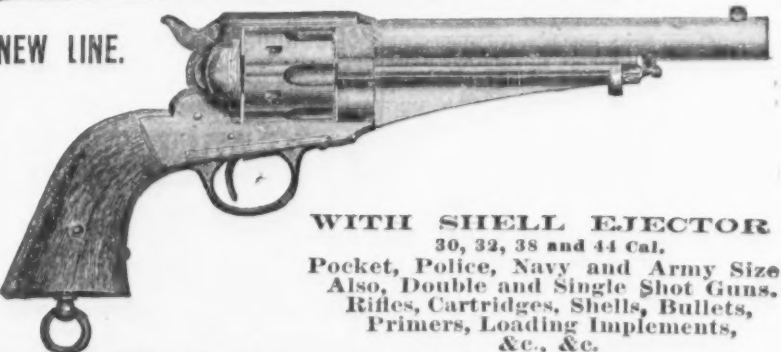


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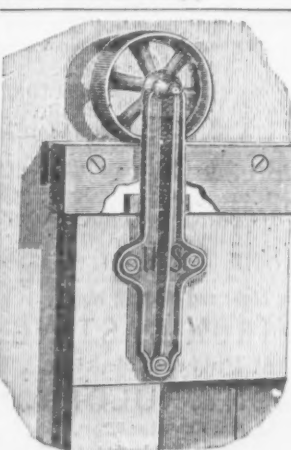
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**THE U. S. WOOD TRACK BARN DOOR HANGINGS.**

Patented April 13, 1863; Reissued Jan. 11, 1881.

Reissued April 10, 1881.

This patent covers all rail with a recess in the under

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They cannot be thrown off the track.

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Making Iron Columns Secure.

So many accidents to life and property have occurred at fires by the sudden giving way of iron columns used for supports to the various floors of buildings, that such columns are looked upon with distrust by firemen and their use discouraged. When they become heated by fire they are apt to break entirely, thus letting the upper floors fall. It was in consequence of the giving way of the iron columns at the Broadway fire, some time ago, that the floors from cellar to roof fell in, and two firemen who were on the roof were hurled to a terrible death in the seething furnace within the building. All large cities are full of buildings whose several floors are supported on iron columns, and, in case of fire, they are quite as likely to collapse as did the one we refer to. Our building laws, which are yet crude and imperfect, permit their use, and, as they are cheaper than almost anything that could be used instead, they are still favorites with builders. The very best thing to take the place of iron columns would be columns of brick, but objection is made to them that they take up too much room and are not ornamental.

Many experiments have been tried with a view to making iron columns fire-proof, or at least sufficiently so to be able to stand a small fire in their neighborhood without bending, and thus bringing the entire building to the ground in ruins long before it would be destroyed by the fire alone. Casing the columns with wood, asbestos, brick-work, etc., has been tried. Recently two more suggestions have been made. One is to inclose the columns in rings of terra-cotta, put on over the top when the column is set up. These would act as a shield to keep off the heat till the fire could be subdued. The plan is simple and inexpensive, and has the added advantage of giving opportunity to make the columns highly ornamental, as terra-cotta readily lends itself to decorative treatment.

The second plan is to fill the columns with water. To do this the plates or castings, usually placed between the columns, where they stand one over the other, have holes or openings of some kind, so that there is a free communication from column to column from the bottom to the top of the building. Where columns are already erected, short pipes are used to connect them at each floor. The uppermost column is also provided with a small escape pipe, passing through the roof to the open air. At the base of each tier of columns a pipe is connected with the street mains, so that all the columns may be filled with water, either permanently or on emergency. When thus filled with water and provided with an escape for the expansion of the water or steam, the columns would stand unharmed until every floor was burned out. Were the girders also hollow and filled with water in the same manner, both girders and columns would undoubtedly stand intact, even after all the floors and the roof had fallen in, and they could be used again in rebuilding. The system has the merit of cheapness and ease of application, and is patented in this country. We have little confidence, however, in iron columns under the conditions incident to a great fire, and the sooner their use is prohibited by law the better it will be for the public.

Mild Steel in the Workshops.—The Steel Company of Scotland have published the following rules: (1) Welding: In welding mild steel plates, it is not necessary to heat them to the same high temperatures as in the case of iron. Instead of a "welding heat," a bright yellow heat is sufficient; and if flux is required, it need only be three parts clean sand to one part common salt, moistened and thrown on the parts in the fire. In making the weld, the fuel used should be free from sulphur; otherwise red-shortness may result. (2) Flanging: In flanging, care should be taken in the local heating that the parts are not overheated, and that no hammering or work is put upon them while at a black heat; further, the plate should be protected from chills, if it is not convenient to keep it warm. (3) Annealing: After completing either welding or flanging, the whole piece should be heated to a cherry-red heat and slowly cooled. (4) Orders: In ordering steel plates, care should be taken to state the purpose for which they are to be used.

The following is a comparative statement of duties levied in France on Iron and Steel under the new general tariff in francs and centimes:

Arms, breechloaders.....	35 0
Arms, barrels, unfinished.....	60 0
Pig iron, 100 Kilog.....	8 0
Bar, angle, T rail, and machine iron, 100 Kilog.....	6 0
Sheet iron, rolled or hammered, exceeding 1 millim. in thickness.....	7 50
Not cut out, 100 Kilog.....	8 0
Cut out in any way, 100 Kilog.....	6 0
Steel bars, rails, 100 Kilog.....	9 0
Other kinds and hoops, 100 Kilog.....	9 0
Steel in sheets and bands, brown, hot rolled, exceeding 1/2 millim. in thickness.....	9 90
Cut out in any way, 100 Kilog.....	9 0
Not cut out, 100 Kilog.....	16 50
1/2 millim. or less in thickness.....	15 0
Not cut out, 100 Kilog.....	16 50
White, rolled cold, any thickness.....	15 0
Cut out in any way, 100 Kilog.....	15 0
Not cut out, 100 Kilog.....	15 0

The steamer Cygnus, the pioneer of the new fleet of iron steamers building by Messrs. Roach and Cramp, made her first trip on the 26th ult. Her Captain is Charles P. Smith, late of the Senawhaka. She is 230 feet in length and 33 feet beam, and is capable of carrying 2200 passengers. The hull is divided into twelve air tight compartments, so that, as remarked by Mr. Roach, who was on board, "if she were cut into two pieces, each part of the boat would continue to float and carry its passengers."

[One hundred prominent business men of Boston assembled last week, to consider the expediency of holding a World's Fair in 1885, and the report of the committee appointed was expected to be decisive. Full confidence was expressed that the scheme was feasible.]

For underground iron structures—wide levels, air-ways, and principally transport

galleries—arches or ellipses made of double T wrought iron have been introduced in European mines. Another description of these underground iron structures are the water-tight trap doors in water-tight dams of masonry, which in the principal levels are walled across at certain places, in order to secure the vital parts of a mine against the sudden inroads of water from the water-bearing strata above the old workings, which are liable to settle down in such a manner as to open a way for the water. These dams are provided with one or two strong iron trap doors which allow the ordinary passage, but, in case of need, can be secured by water-tight packings and strong fastenings. Such iron trap doors weigh nearly two tons each, and are made with great thoroughness, of thick boiler plates.

The contractors have practically completed the mason work on the new Eddystone Light-house six months ahead of time. The tower is said to be a very beautiful and remarkable piece of masonry. Not one of the granite blocks from top to bottom shows the faintest discoloration. The contractors will no doubt find their reward for the promptness of their work, but they are none the less deserving of credit, for the new structure with its more powerful lights will, by reason of this efficiency, come into use at a much earlier period than was anticipated, much to the advantage of Channel navigation. The light-house has been constructed by Messrs. Hugh Shearer & Co., of the De Lank granite quarries, near Bodmin, in a yard at Wadebridge, where every one of the 2200 stones has been brought to its exact shape and fitted, each section of the building being put up in turn prior to shipment.

Baron Max Maria von Weber, son of the great composer, and one of the most prominent railway engineers of Germany, died suddenly of heart disease in Berlin last month. He had only recently completed a report on the canals and railways of this country, which he visited last year.

Under the proposed new French commercial treaty with England, the duty on Canadian-built ships is reduced to a nominal figure, and the Montreal Herald anticipates a large export trade in wooden ships, should the treaty go into effect.

A Berlin dispatch to the Morning Post says: The first electric railway, now working in the vicinity of Berlin, is so satisfactory that a second is projected, to run to another district of the suburbs. The cost of construction is only £7500 per kilometer.

The imports of dry goods at this port for the last five months amount to \$47,105,869, or about \$10,000,000 less than for the corresponding months last year. This looks bad for general trade.



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There are six patents, domestic and foreign, on

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We own them all, and shall suppress infringements. The genuine cleaner is plainly stamped, "Manufactured by Perfection Window Cleaner Co., incorporated July 26, 1878." Has patent hollow handle with P. W. C. Co. cast in face. Our manufacturing facilities are so large that we undersell cheap and worthless imitations. We gladly mail sample cleaner with price lists to wholesale trade. Address,

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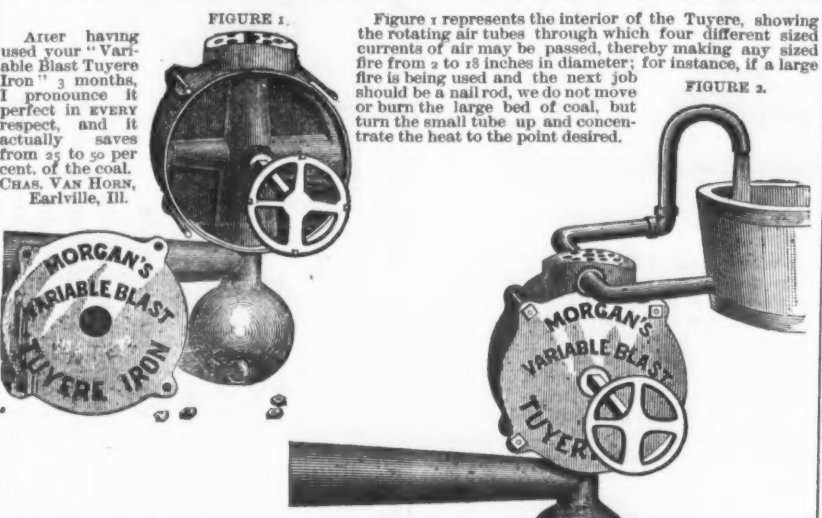
COAL, TIME SAVED! BY USING
And LABOR VARIABLE BLAST TUYERE IRON.

Figure 1 represents the interior of the Tuyere, showing the rotating air tubes through which four different sized currents of air may be passed, thereby making any sized fire from 2 to 18 inches in diameter; for instance, if a large fire is being used and the next job should be a nail rod, we do not move or burn the large bed of coal, but turn the small tube up and concentrate the heat to the point desired.

Figure 2 represents the Water Tuyere complete, the constant flow of water keeps the Tuyere cool and prevents cinders or clinkers from forming in the fire. To prevent the water from freezing in the pipes, the barrel is supplied with a faucet that empties the pipes, but not the barrel.

All the dirt from the fire sifts through the perforated fire cap into the dirt box, from which it is blown by the blast when the ball valve is raised for that purpose.

Send for price list and discounts.

A. W. MORGAN, Patentee and Manufacturer,
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THE CHAMPION

Barbed Wire

Patented Nov. 4, 1879, and licensed and protected under all the patents and decisions.

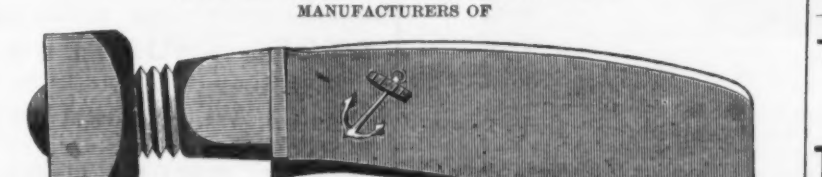
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PHOSPHOR-TIN!

Phosphor-Bronze is daily gaining favor with manufacturers who have to use a metal of great toughness and durability, of fine grain, high tensile strength and ductility, and is acknowledged far superior to any other alloy on account of the readiness with which it takes a polish, its elasticity, fluidity and beauty of color. Its high price, however, has so far prevented the use of it to so large an extent as its merit would warrant. For the first time an article is offered herewith which makes it easy for everybody to manufacture his own Phosphor-Bronze of the grade it is wanted, by the simple process of melting. This article is PHOSPHOR-TIN. By melting a very small quantity of it with copper an excellent Phosphor-Bronze is obtained at a much cheaper price than the ready made Phosphor-Bronze can be had in the market. A trial ought to be made by everybody who is using it.

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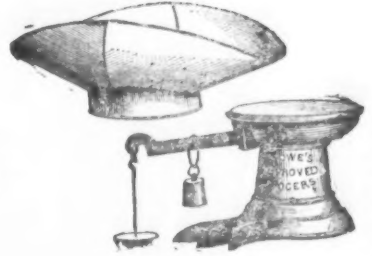
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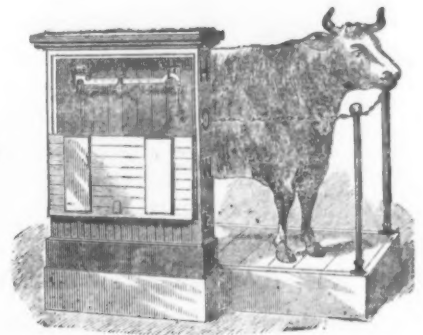
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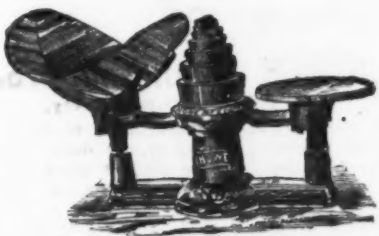
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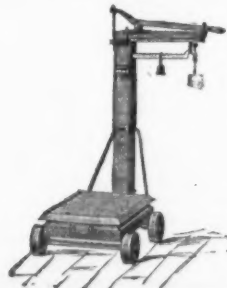


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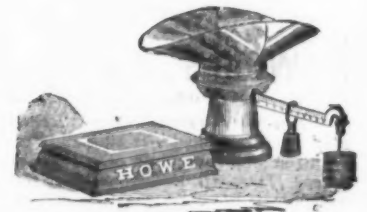
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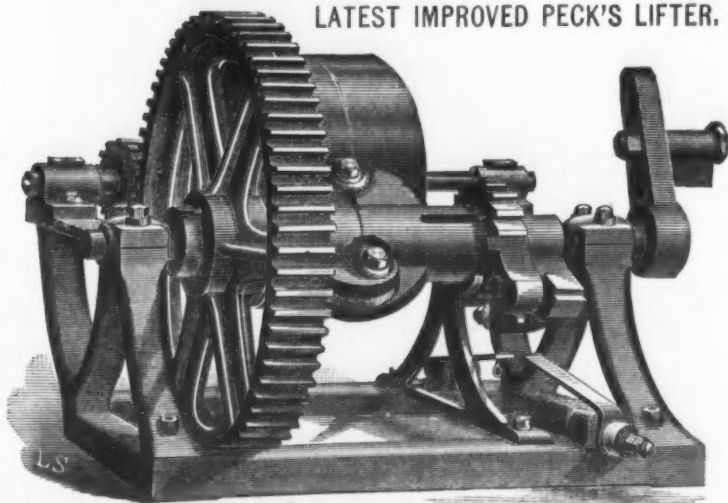
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Cannot be Excelled for Durability, Simplicity, Strength or Efficiency.

Is not a comparatively new machine, but has been thoroughly tested for years.

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Manufacturers of Tin and Stamped Ware,
100 Beekman Street, New York, Dec. 18, 1880.
Messrs. BEECHER & PECK.—Gentlemen: We have eighteen of your Drop Presses in constant use and they give entire satisfaction. They have been tested for all kinds of work with but slight cost for repairs. We can cheerfully say a word in their favor.
(Signed) Very truly, E. KETCHAM & CO.

C. COWLES & Co.
Manufacturers of Carriage Hardware and Trimmings,
New Haven, Feb. 22, 1881.
Messrs. BEECHER & PECK.—Gentlemen: We have had your Drop Presses in use for over 25 years, and after investigation (about a year since) satisfied ourselves it was not for our interest to make a change, therefore ordered three more.
Sincerely yours,
R. P. COWLES, Pres.

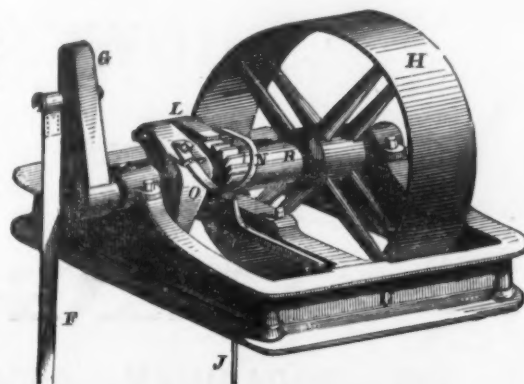
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Messrs. BEECHER & PECK.—Dear Sirs: We have been using the Milo Peck Drop and Lifters for more than 20 years. We have used various other Drop Presses, and after careful trials we give yours the preference. Your Drop Presses for our use are the most durable and cost far less for repairs than any other we have used. We have one of the Peck Lifters in use to-day that was put into our factory 21 years ago, and though in constant use for that time is in good condition now. Counting the new Drop Press you shipped to us yesterday we have 19 of the Peck Drop Presses now in use. Very truly yours,
H. D. SMITH & CO.

DOVER STAMPING CO.
Factory Office: No. 153 Putnam Street,
CAMBRIDGE, MASS., March 22, 1881.
Messrs. BEECHER & PECK.—Gentlemen: All of our Drops are of your make, and we have 15 all told. They have given us entire satisfaction in every way and that they are all your make would seem a sufficient guarantee of how well we like them. Respectfully yours,
(Signed) DOVER STAMPING CO.
By E. H. WHITNEY.

New York, April 7, 1880.
MILPECK & Co.—Gents: We have now in use eight Lifters and six Drop Presses of your make, and for Stamping Tin, Copper, Sheet Iron, &c., we consider them superior to anything else in use that we have seen or heard of.
Yours truly,
E. KETCHAM & CO.

DOVER, N. H., June 13, 1880.
MILPECK, Esq.—Dear Sir: In reply to your inquiry how we like the Drop Press we purchased of you more than two years ago, we are prepared to say that it has and does give entire satisfaction in every respect.
Yours truly,
DOVER STAMPING CO.,
E. D. GOODRICH, Agent.

NEW HAVEN, Sept. 12, 1880.
MILPECK, Esq.—Dear Sir: We have had two of Peck's Patent Drop Presses in almost daily use for several years and certify that they operate to our entire satisfaction. We have tried other plans, but are fully persuaded that this is the best.
(Signed) C. COWLES & CO.



The above are a few of many Testimonials selected to show how the Peck Drop Press has kept in the public favor for so long a period, which is the strongest proof of their superiority.

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R. NEWTON, C. E. M. E., Supt.

JOHN TURNER, Treas.

JOHN SHORE, Sec'y.

To Manufacturers, Bleachers, Dyers, and all Users of Steam: We wish to call your special attention to our PATENT STEAM TRAP, acknowledged by practical engineers and manufacturers to be the best, simplest, most effective and durable Trap ever brought before the public. The simplicity of this Trap consists of doing away with all expansions and contractions, no glands or stuffing boxes, or bolts of any description required; no compound cylinders and no copper rods. The cover can be removed at any time to see it work; and if required the discharged water can be elevated from two to thirty feet, so that it can be used for other purposes. They will last from thirty to forty years. As regards frost and snow it makes no difference, as we have had and still have one working in the open air at Washington Mills, Lawrence, Mass., and it has done its work well, never having had any trouble with it, and bids defiance to all weather. That they have been thoroughly tested can be seen by the testimonials given below, of the few that have come to hand:

TESTIMONIALS.

Washington Mills, Lawrence, Mass., November 18, 1880.
Mr. R. Newton.—Dear Sir: The Steam Trap we bought of you last August works admirably. Please send us another as soon as possible.
Yours truly,
JAMES B. SINKER, Mech. Supt.

Office of Washington Mills, Boston, December 24, 1880.
Providence Steam Trap Co.—GENTLEMEN: Please forward to Washington Mills as soon as possible six (6) 1/2-inch Traps and send bill to me.
Yours truly,
HENRY F. COE, Treas.

Clyde Bleachery and Print Works, River Point, R. I., January 17, 1881.
Mr. R. Newton.—Dear Sir: The Steam Trap we had of you is in successful and very satisfactory operation. Its simplicity in construction and undoubted durability will commend it to all who are in want of a superior Steam Trap. We shall order more when in need of any.
Yours truly,
S. H. GREEN & SONS.

Kendall Manufacturing Co., Providence, R. I., Feb. 1, 1881.
Providence Steam Trap Co.—GENTLEMEN: We have used one of your Steam Traps for some time and would say that we find it gives perfect satisfaction.
Yours truly,
NICHOLAS SHELDON, Treas.

A. & W. Sprague Mfg. Co., Cranston Print Works, R. I., Jan. 15, 1880.
Mr. Robert Newton.—Dear Sir: The Steam Traps we bought of you work first-class and give every satisfaction, and appear to be very durable. We think them the best Steam Trap that we have ever had. When in want of more will write you.
I remain, yours, truly,
THOMAS BRISTOW, Supt. Cranston Print Works.

Providence, R. I., December 18, 1880.
Mr. Newton.—Dear Sir: We have your Steam Trap working satisfactorily, and can conscientiously recommend it to all.
Yours, very truly,
B. COLLINGHAM, Supt. Atlantic Mills.

ROBERT NEWTON, C. E. M. E., Inventor and Patentee, Providence, R. I.

PATENT OSCILLATING FIRE BARS.

We wish also to call your attention to R. Newton's PATENT OSCILLATING FIRE BARS, which for durability, economy and application are acknowledged by all practical engineers that have seen them up to the present time to be the best ever brought before the public. This invention the patentee has labored at more or less since 1851. These bars have long been wanted, and their use will at once prove their efficacy as an economiser of fuel and labor. These bars can consume from four to twenty-six pounds of coal per square foot of grate, per hour, and not warp; and the apertures can be kept clean so that they can get a regular supply of oxygen, which is the life-giving power of calorific. They can be applied to all kinds of boiler surfaces (except vertical), and can be fitted to the furnaces in about five hours. Testimonials can be forwarded, if required, to show that they are now in use in some of the largest firms in the world.

SOME OF THE ADVANTAGES: These bars allow the use of inferior coal; evaporating power is greatly increased. This is a great boon where boiler power and space is limited. This advantage cannot be over-estimated in the case of marine boilers. The oscillating of the fire bars both cuts and lifts the slug, and clears the apertures at the same time. The bars give four motions in one oscillation, and cannot get out of order. They are also free of expansion and contraction, both longitudinal and transversal, and however careless the stoker may be he cannot leave them so as to take any harm. They are so cast, and of such metal, that they are the most durable bar ever brought into use. All now in use are very much approved. They are very simple and cannot get out of order. Their cost is so reasonable that they come within the reach of all. The company are now granting licenses to several firms to make and apply them, and are open to arrange with other parties. N. B.—The company furnish first sets of models.

Agents wanted for different locations.

All communications should be addressed to PROVIDENCE STEAM TRAP CO., P. O. Box 1213, Providence, R. I.

THE OHIO GRINDSTONE CO.

MANUFACTURERS OF

GRINDSTONES

SUITABLE FOR ALL PURPOSES AND IN ANY QUANTITY.

Cleveland, Ohio.

CROCKER'S REVERSIBLE, SELF-PACKING & SELF-CLEANSING FILTER

PATENTED JUNE 29, 1880.

Readily Cleansed without Removing from the Faucet.

Warranted Never to become Inoperative.

Always as Easily Reversed as when first put into use.

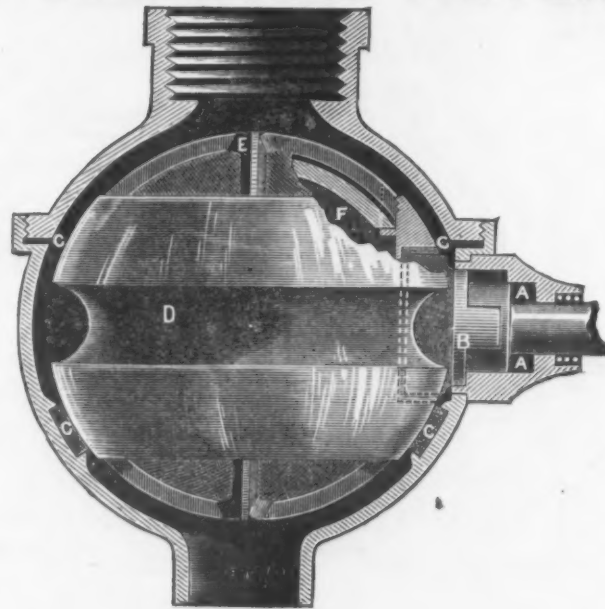
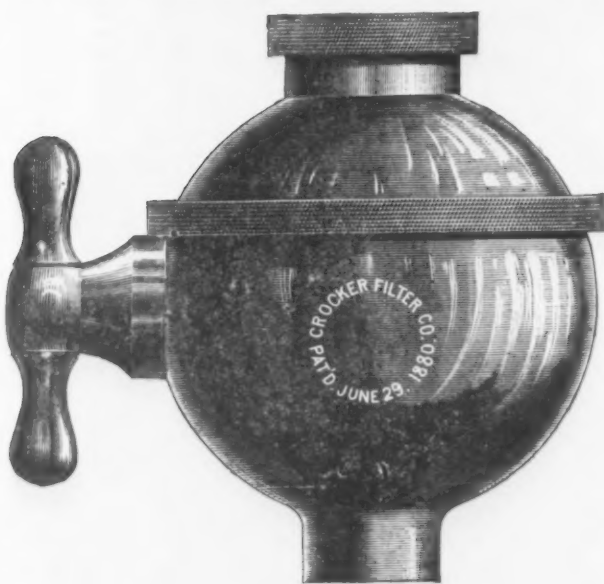
The Most Perfect and Effective Filter and Purifier yet Produced.

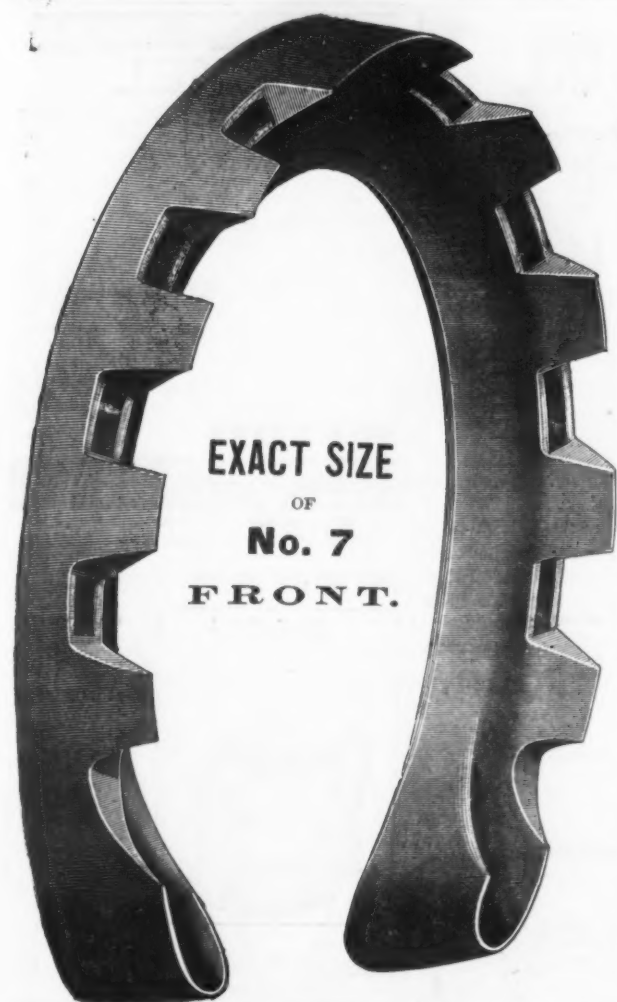
Made in three sizes for household use, and from 10-inch to 30-inch diameter for use on BOILERS and in MANUFACTURING ESTABLISHMENTS.

Do not mistake this for any other reversible or revolving Filter. The Crocker is an entirely new invention, patented as above.

CROCKER FILTER CO.,

174 HIGH ST., BOSTON, MASS.





EXACT SIZE
OF
No. 7
FRONT.

DUNNING STEEL HORSE SHOES

Will outlast Three Iron Shoes.

Are FORGED from a SOLID BAR of STEEL. Afford a FIRM LEVEL BEARING, thereby securing to the horse the most natural position for comfort and speed.

Is a SELF-CLEANING Shoe, and will not "ball" up.

Equally good for Summer or Winter use.

Will prevent horses from "calking" or growing corns. Can be re-sharpened as readily as an Iron shoe.

Read Following Testimonial:

Office of NORTH CHICAGO CITY R. R. Co.,
CHICAGO, Feb. 16, 1881.

Chicago Steel Horse Shoe Company.

GENTS: We are using your "Dunning Steel Horse Shoe" on our car horses, and find they last us from three to four months before being worn out. We drive our horses about 16 miles a day—half over cobble stones and balance pavement. We consider them the Best Shoe made.

M. W. SQUIRES, Supt.

We pack shoes, single sizes, in kegs of 100 lbs. each; also, the following assortments, Front and Hind, 1, 2 and 3; and 3, 4, 5 and 6; and 7 and 8. The larger sizes are packed single numbers in a keg. Our Nos. 4, 5 and 6 are about same sizes and weights as the 2, 3 and 4 Iron shoes. Send for sample set for trial. Catalogues sent on application.

Manufactured exclusively by

THE CHICAGO STEEL HORSE SHOE CO.
Office, 24 West Lake St., CHICAGO.

BELLAIRE NAIL WORKS, PIG IRON AND NAILS,

Manufacture the Celebrated Brand of

BELLAIRE NAILS

Office and Works, - - BELLAIRE, OHIO.

THE "EAGLE" ANVIL.

WARRANTED!!

Better than the Best English Anvil.

Face in one piece, of BEST TOOL CAST STEEL. PERFECTLY WELDED, perfectly true; of hard-as-temper and never to come off or "settle." It does not bounce the hammer back, and therefore can do more work with lighter hammer. Horn of tough untempered steel, never to break or bend. Only Anvil made in United States fully warranted as above. None genuine without our trade-mark.

N. B.—That the "Eagle" Anvil is the only one made at Trenton, New Jersey, and it must not be mistaken for an Anvil in the market called Trenton, but which is really of foreign manufacture, and an imported imitation of the English Anvil.



LATEST PATENT
APRIL 24, 1877.

ESTABLISHED
1843.

SOLD BY

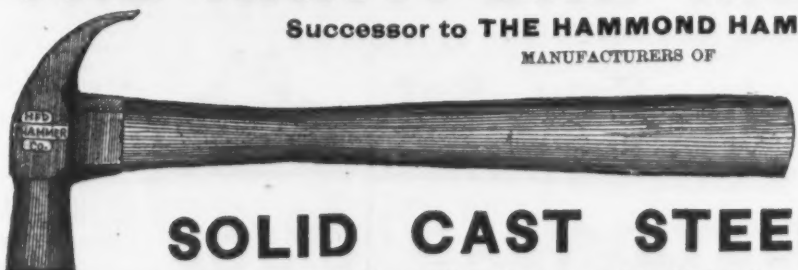
New York—RUSSELL & ERWIN MANUFACTURING COMPANY, DUNN & McCARTY, TENNIS & WILSON.
Philadelphia—JAMES C. HAND & CO. Boston—GEORGE H. GRAY & DANFORTH.

Baltimore—W. H. COLE & SONS, JOHN R. KELSO, JR.
Louisville—W. B. BELKNAP & CO. Cincinnati—POST & CO.

Cleveland—THE LAKE ERIE IRON CO.

THE HARTFORD HAMMER CO.,

Successor to THE HAMMOND HAMMER CO.,
MANUFACTURERS OF



Lists furnished on application.

SOLID CAST STEEL HAMMERS,

Adze Eye and Bell Faced Nail Hammers, Machinists' and Blacksmiths' Hammers.

The attention of the trade is called to this line of goods as superior in style, quality and workmanship to any in market.

Hartford, Conn., U. S. A.

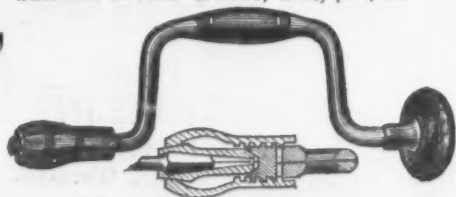
JOHN S. FRAY,

Successor to FRAY & PIGG, Bridgeport, Ct.



Spofford Hit Brace.

The Spofford Hit Brace is made under Letters Patent of the U. S. A., granted to N. Spofford, March 23, 1880, assigned to Fray & Pigg, and now held by John S. Fray, Mr. Pigg having retired from the firm.



Spofford Sleeve Brace.

Cocobolo Head and Handle. Sleeve Brace.

No. 7.....7 inch sweep.	No. 107.....7 inch sweep.	No. 70.....7 inch sweep.
No. 8.....8 "	No. 108.....8 "	No. 80.....8 "
No. 9.....9 "	No. 109.....9 "	No. 90.....9 "
No. 10.....10 "	No. 110.....10 "	No. 100.....10 "
No. 11.....11 "	No. 111.....11 "	No. 110.....11 "
No. 12.....12 "	No. 112.....12 "	No. 120.....12 "
No. 13.....13 "	No. 113.....13 "	No. 130.....13 "
No. 14.....14 "	No. 114.....14 "	No. 140.....14 "



We claim the BEST PORTABLE MILL made for grinding good Corn Meal for table use. It requires little dressing. Grinds from 100 to 200 bushels with one dressing. It makes round meal, not floury and pasty. It takes from 20 to 33 per cent. less power than any other Mill not using our Stones. Address NORTH CAROLINA MILL STONE CO., Westminster, Md.

"I have a pair of Moore County Grit Mill Stones which have been in use 50 years, constantly under heavy power. Grind 10 to 20 bushels per hour. Dress every 1000 bushels, and they make the best meal in the country. If I could not replace them with same grits, I would not part with them for five times the cost of ordinary stones. I believe them to be superior to any known stone or hear for grinding corn meal. Respectfully yours,
GEORGE E. TATE, Mountain Lake, N. C."

ANVILS & VISES.

Joshua Wilkinson & Sons,
DUDLEY, ENGLAND.

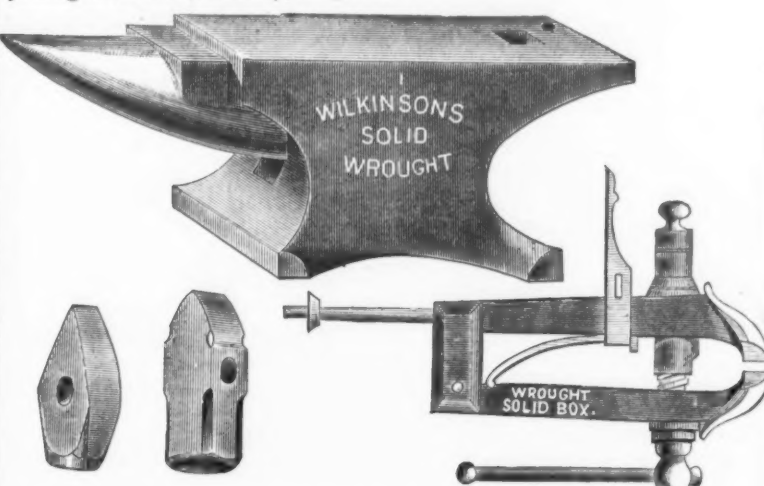
Manufacturers of

Solid Wrought Steel Face Anvils,

Wrought Solid Box Vises,

Wrought Steel Face Hammers.

In quality and finish, and in the mode of manufacture, these goods are identical with "Wrights," being made by the same workmen in adjoining factories at Dudley, England.



A full assortment will be kept in stock by the Agents, and deliveries made in large lots, f. o. b. at Liverpool, New York or Philadelphia. Small lots delivered from Warehouse at Philadelphia only.

NEWLIN & YARDLEY,
Sole Agents for the United States,
PHILADELPHIA.

Agents for "CROWN" Crane Chains, and
"Best Proved" Chains of all sizes.

NEW YORK DEPOT: 83 Maiden Lane.

THOMAS S. NEWLIN,
Agent for New York City and New England States.

Deliveries for Middle, Western and Southern States made from Philadelphia.

BUCKEYE LAWN MOWERS.

BEAUTIFUL IN APPEARANCE AND FINISH,
NOISELESS IN OPERATION AND EASY TO WORK,
SIMPLE IN CONSTRUCTION, YET
STRONG AND EFFECTIVE.



THE BUCKEYE JUNIOR
LAWN MOWER
MANUFACTURED BY
MAST FOOS & CO.
SPRINGFIELD, O.

The only successful
LOW PRICED
LAWN MOWER
in the market.
Made in three sizes—
10, 12 and 14 in. cut.

BUCKEYE SENIOR.
FIVE SIZES—10, 12, 14, 16, 18 IN. CUT.

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BLACK & OWEN, Detroit, Mich.
P. P. MAST & CO., Philadelphia, Pa.,
PAPPENHEIMER HDW. CO., Cincinnati, Ohio,
D. E. GOLDSMITH, San Francisco,
CHAS. H. GEORGE & CO., Providence, R. I.,
MAST, FOOS & CO., Liverpool, Eng.,
BRINTNALL, LAMB & CO., Chicago, Ill.

ROGERS, ENGLE & CO., Dayton, Ohio,
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DEERE, MANER & CO., Kansas City, Mo.,
SEMPLE, VALLE & BURCHARD CUTLERY CO.,
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GEO. A. LOWE, Salt Lake, Utah,
DUFF & McKEAN, Pittsburgh, Pa.,
J. DAULTON, Paris, France.

Correspondence solicited, and full information, with circulars, furnished on application to

MAST, FOOS & CO.,

Springfield, Ohio, U. S. A.



MERIAM & MORGAN PARAFFINE CO.,
Cleveland, Ohio.

THE BEST GREASE

For all kinds of

Wagons, Threshers, Cog Gearings,
Heavy Bearings, &c.

NEW YORK, 143 Front St.,
BOSTON, 32 Oliver St.,
CHICAGO, FERRIS & AVERY,
Agents, 48 No. Wells St.

OILS.

BAEDER, ADAMSON & CO.

Manufacturers of SAND & EMERY PAPER & EMERY CLOTH.

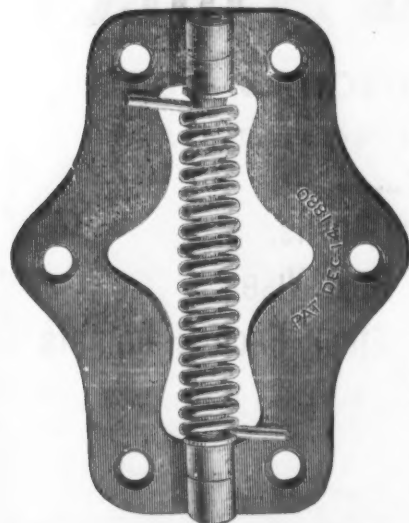
(Also in Rolls, for machine work.)

Ground Emery, Corundum & Flint, Clue & Curled Hair, Hair Felt, & Felt-
ing for Covering Boilers, Pipes, &c., Cow Hide Whips.
PHILADELPHIA, 730 Market St., BOSTON, 143 Milk St.
NEW YORK, 67 Beekman St. CHICAGO, 182 Lake St.

SPRING HINGES.—SCOVILL MANUFACTURING CO.

WROUGHT IRON WITH BRASS SPRINGS.

Packed with Screws.



SINGLE JOINT.

	Per doz. Pairs.
2 1/2 inch, No. 301.....	\$3.60
3 " " No. 303.....	4.40
4 " " No. 305.....	6.75

DOUBLE JOINT.

	Per doz. Pairs.
2 1/2 inch, No. 311.....	\$7.20
3 " " No. 313.....	8.80
4 " " No. 315.....	13.50

WROUGHT BRASS.

SINGLE JOINT.

	Per doz. Pairs.
2 1/2 inch, No. 1.....	\$3.00
3 " " No. 3.....	4.50
5 " " No. 5.....	7.50

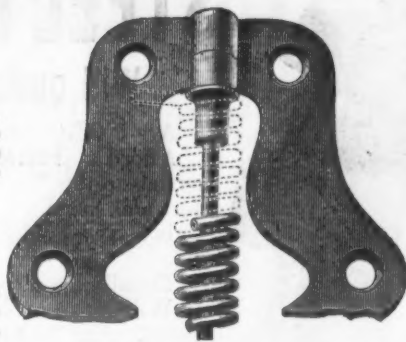
DOUBLE JOINT.

	Per doz. Pairs.
2 1/2 inch, No. 7.....	\$6.60
3 " " No. 9.....	8.30
5 " " No. 11.....	16.50

SCOVILL MANUFACTURING CO.,

WATERBURY, CONN.

(419 & 421 Broome Street, New York.
Depots: 177 Devonshire Street, Boston.
183 Lake Street, Chicago.)



The above Spring is removed near the joint to SHOW the SLEEVE. This is the VITAL POINT in a Spring Hinge, and they are only to be found on Hinges of our manufacture. In all others the Spring will soon break from wear against the pin.

BEARDSLEY SCYTHE COMPANY, West Winsted, Conn.

Manufacturers of the well-known brands of,



German Steel, Cast Steel and Silver Steel Grass Scythes.

ALSO THE

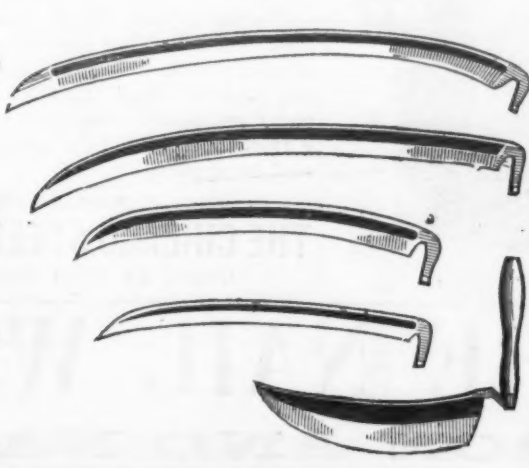
Clipper, Emperor, Beardsley's Golden Trimmer, Conqueror, Dutchman, Waldron, &c.

ALSO

Silver Steel, Clipper & Harvest Victor Grain Scythes, Common Pattern & Spear Point Hay Knives.

ALSO

Corn Knives, Bush & Weed Scythes.



CLARK'S



IMPROVED SCREW DRIVER, And Case containing Handle and Set of SCREW DRIVERS.

The Blades are made of JESSOP'S CAST STEEL, with milled Points and Shanks, making them interchangeable, and are warranted.

This Driver has four Blades from 1/4 Inch to 1 Inch in width.

ALSO MANUFACTURER OF WILLIAM A. CLARK'S **Expansive Bit**, with two Cutters, boring from 7/8 to 3 inches.

R. H. BROWN & CO.,

SUCCESSORS TO

WM. A. and F. E. CLARK,

WESTVILLE, Conn.



SHELTON & CO.,

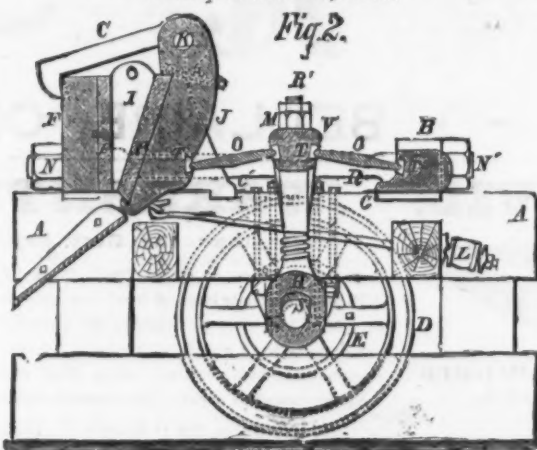
Manufacturers of every variety of



Carriage, Tire, Machine, Plow, Stove and Spring Bolts, Coach and Bed Screws, &c. BIRMINGHAM, CONN.
Coulter, Flagler & Co., Agents, 87 Chambers Street, New York.

THE NEW BLAKE CRUSHER, OR, BLAKE'S CHALLENGE ROCK BREAKER.

Patented Nov. 18, 1879.



The most economical and reliable Crusher in use. Superior in all respects to our old style Blake Crushers, and rapidly superseding them and all imitations. For railway ballast, Macadam road making, and crushing of ores of all kinds it has no competitor.

This machine dispenses with cast iron frame and pitman of our old forms. All strains are on wrought iron or steel.

Awarded medals of superiority by judges of American Institute Fair, New York City, 1879 and 1880, where it was exhibited in competition with our old forms of Crusher.

Address,

BLAKE CRUSHER CO.,
Sole Makers,
NEW HAVEN, CONN.

Whiting's Patent Saw Set.

FOR LUMBERMAN'S CROSS CUT SAWS.

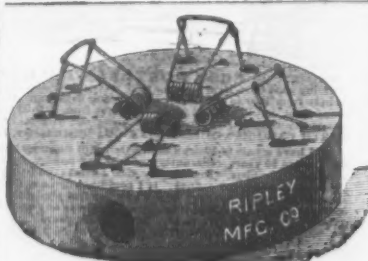
It does not bend the tooth the whole length, but sets where the set in a saw is required, at the point of the tooth only.



HORACE F. SISE,

SOLE AGENT,

100 Chambers Street, - - - NEW YORK.



"COMMON SENSE" MOUSE TRAP.
BEST IN MARKET.

For Home & Export Trade.

RIPLY MFG. CO.,
Unionville, Ct., U. S. A.,

Manufacturers of
Porcelain-Lined Lemon Squeezers, Mallets, Rose-wood Faucets, Patent Boot Jacks and House Furnishing Ware.

WESTON DYNAMO-ELECTRIC MACHINE

NICKEL.

The rapid increase in the use of Nickel-Plating owing to the introduction of the Weston Machine and the very low price of nickel material, enables us to give greatly reduced estimates for complete outfits.

We are furnishing outfits specially adapted for Stove Work, giving a pure white deposit on plain or metal surfaces.

Outfits complete, with Dynamo-Electric Machine Tanks, Anodes, Solution, &c., &c., \$250.

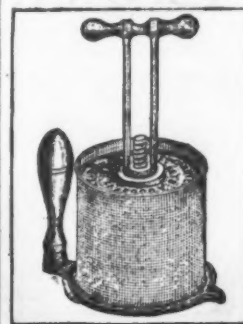
We beg to refer to the following Stove Manufacturers among our solution houses using the Weston Machine: Richardson & Boynton, S. S. Jewett & Co., Fuller, Warren & Co., Perry & Co., Detroit Stove Works, Michigan Stove Co., Co-operative Stove Co., E. & C. Gurney, Hamilton & Toronto, and many others.

INFRINGEMENTS.
We call attention to infringements of the Weston Machine, in which Automatic switches are used to prevent change of current. The Weston Co. are owners by grant or purchase of all forms of Automatic Switches for Plating Machines. The adoption of these machines will certainly lead to great loss to parties purchasing or using them.

CONDIT, HANSON & VAN WINKLE
Sole Agents **NEWARK, N. J. U. S. A.**

NEW YORK OFFICE, 92 & 94 Liberty St.
ENGLISH AGENCY: 18 Caroline Street, Birmingham.

The American Fruit & Jelly Press.



A necessary household article for pressing the juice from berries, fruits and herbs of all kinds. Also, for making medicines and lard.

Address,
American Fruit and Jelly Press Co.,
CINCINNATI, OHIO.

BOLSTER SPRINGS FOR FARM WAGONS.
Made of Best Oil Tempered Steel
SOMETHING NEW!



They save largely from wear and tear in every part of the wagon. They remove all necessity for a Spring Seat. They convert a common Limber Wagon into a Spring Wagon, making it equally comfortable for from one to twenty persons. They are admirably adapted to the wants of Fruit and Vegetable Growers. They are suited to all makes and sizes of Farm Wagons, and can be attached by any one. They make the cheapest and easiest riding Spring Wagon in the market. These Springs have been in practical use for over three years, and are a pronounced success. No Teamster or Farmer can afford to be without them. We want Agents everywhere. Send for description and price, and mention this paper.

SMITH & BIRCH MFG. CO., St. Louis, Mo.

FAVORITE CURRY COMB.

Rounded Malleable Iron Teeth.



No sharp points to cut or tear the flesh or hair. At price of ordinary Curry Combs. Exclusively manufactured by us under Norton's patent.

CRANDAL, STONE & CO.,

Binghamton, N. Y.

CLOTHES WRINGERS.



T. J. ALEXANDER, Manager,
BOSTON, MASS.



Established 1838.
Bevin Bros. Mfg. Co.,

Bathampton, Ct.
Manufacturers of
SLEIGH BELLS,
House, Tea, Hand,
Gong Bells, &c.
Bell Meta Kettles.



John Waldron,
Manufacturer of
Sprout's Double and
Single Shear

Horse Hay Forks
And
Sprout's
HAY ELEVATORS,
PULLEYS and
GRAPPLES.

Send for Circulars.
Mason, Lycoming Co., Pa.



DAVID ROUND
HAND MADE COIL
CABLE & BLOCK
CHAINS.
CLEVELAND, O.
SEND FOR PRICES.

AGENTS WANTED.

LAMBETH'S IMPROVED FLY FAN.

Patented Dec. 1, 1863; May 12, 1874; January 16, 1877;
April 17, 1877; March 9, 1880; June 8, 1880;
June 29, 1880; Nov. 23, 1880.

Made in three styles—brass, nickel-plated, or decorated china base, to meet various tastes, with the corrugated tubular stem, and projections nickel-plated, to which the Fans are attached, revolving noiselessly above the head, with no inconvenience to persons seated at the table.

The machine is self-acting, keeps flies off the table, winds up like a clock, and runs about one hour and a half at each winding.

It is light and portable, a perfect substitute for the old fly brush in the hands of a servant, and occupies less space on the table than a caster.

It is easily set on a bed or chair to keep flies off children or the sick.

To the invalid, in summer, it is a most welcome companion.

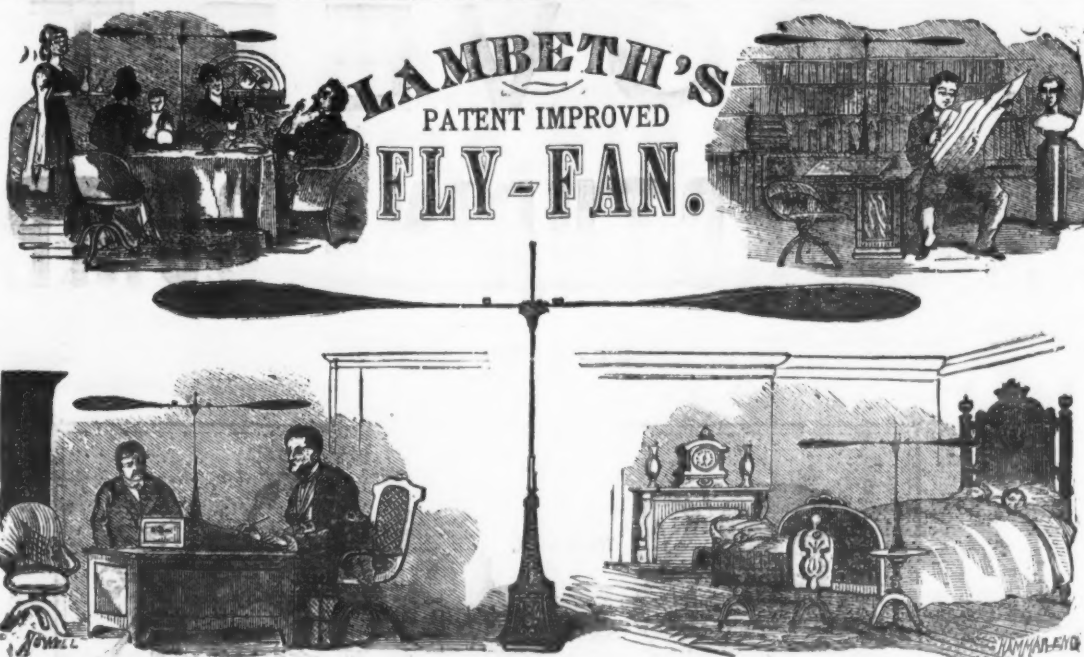
Hardware, Housefurnishing, Crockery, Jewelry Stores, &c., find it one of the best and fastest selling articles ever introduced. Over 50,000 are now in general use in the best hotels and in private families throughout the country.

For the trade the Fans are securely packed one dozen in a case; each case weighing, according to style of base, from 75 to 120 pounds.

For prices and further particulars address general agents, or

S. W. LAMBETH,

Sole Proprietor and Manufacturer,
42 South Third St., Philadelphia, Pa.

LAMBETH'S
IMPROVED
FLY FANS.

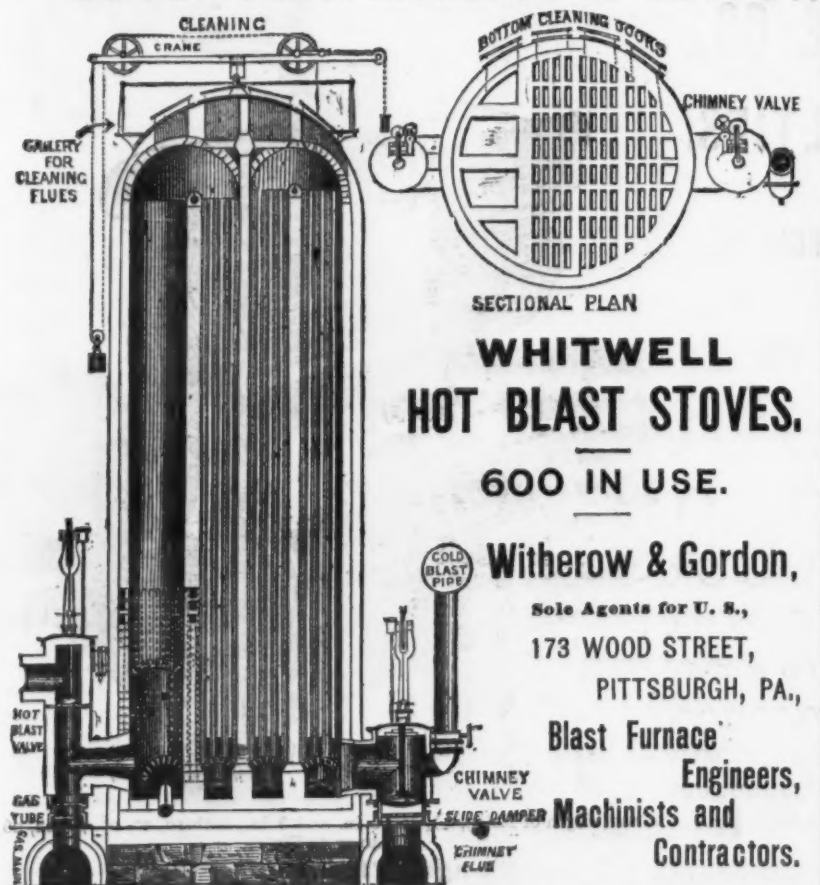
Supplied to the trade by the following general agents, who will promptly fill all orders at guaranteed manufacturer's prices:

Bridgeport Brass Co. New York.
E. Ketcham & Co. New York.
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Wm. Hodges Philadelphia, Pa.
Matthai, Ingram & Co. Baltimore, Md.
Dowie & Moise Charleston, S. C.
McBride & Co. Atlanta, Ga.
Howell, Gano & Co. Cincinnati, Ohio.
Tarwater, Snyder & Rankins. Louisville, Ky.
Simmons Hardware Co. St. Louis, Mo.
Chicago Stamping Co. Chicago, Ill.
F. A. Walker & Co. Boston, Mass.
Demmler Bros. Pittsburgh, Pa.
Chas. E. Walbridge. Buffalo, N. Y.
Ramon Roses. Barcelona, Spain.

WILEY & RUSSELL MANUFACTURING CO., Greenfield, Mass.,
Lightning Screw-Cutting Machinery and Tools.

Lightning Screw Plates and Bolt Cutters,
Green River Drilling Machines,
Green River Tire Sanders,
Green River Tire Upsetters,
Green River Horse Shoers' Vices,
Green River Tire Wheels.
Special Screw Plates for the use of Model Makers, Carriage Makers, Blacksmiths and others. Taps, Dies and Reamers for use with the Bit Brace. Tire Bolt Wrenches, Nut Wrench, Screw Plates for threading gas pipe.
Send for Illustrated Price Lists and Circular.

Agents in London, England, Messrs. Selig, Sonnenthal & Co.

50 PER CENT. SAVING OF FUEL.
50 PER CENT. INCREASE OF OUTPUT.WHITWELL
HOT BLAST STOVES.
600 IN USE.

Witherow & Gordon,
Sole Agents for U. S.,
173 WOOD STREET,
PITTSBURGH, PA.,
Blast Furnace
Engineers,
Machinists and
Contractors.

THE AMERICAN VENTILATOR

SOLD BY THE HARDWARE TRADE.



THE AMERICAN VENTILATOR

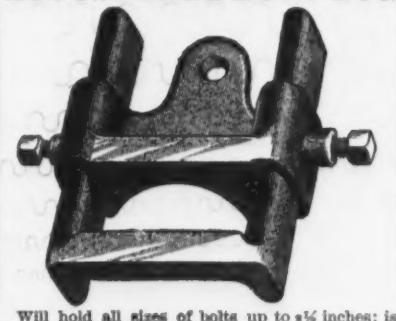
is warranted to work high or low windows easier than all other devices, and defies competition, and only costs about one-third as much as box frames and weights.

W. A. FORD,
PATENTEE AND MANUFACTURER.

O. P. SCHRIVER,
SOLE SUPPLY AGENT,
GREENSBURG, IND.



A. WYCKOFF, Manufacturer,
Chain Pump, Tube, &c.,
ELMIRA, N. Y.

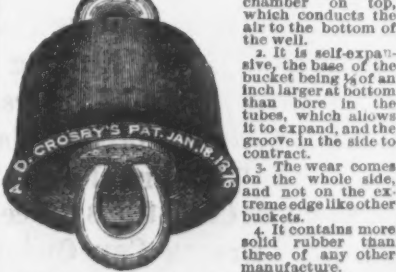
H. H. COLES & CO.,
416 North 19th St., Philadelphia.
ADJUSTABLE BOLT DOG

Will hold all sizes of bolts up to 1 1/4 inches; is very handy for turning flat work. Price, \$1.

The Most Durable and Best Selling
Bucket for Chain Pumps.

It has no valves to become obstructed and no screw joints to become immovable by rust.

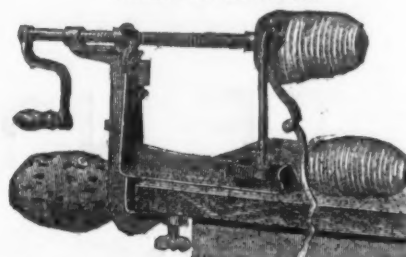
Advantages of the Crosby Bucket over all others:



Send for Price List. Agents wanted in every county. Address
A. D. CROSBY, Patentee and General Agent,
Cuba, Allegheny Co., New York.

GOODELL'S
White Mountain Potato Parer

PATENT APPLIED FOR.



The White Mountain Potato Parer is the only machine ever made that will not only pare a potato much better than it can be done by hand, taking off a thinner paring from every shape or kind of potato but will go into and clean out the eyes, and altogether at a saving of at least 20 per cent. It is free from the objections made to the old style of rattle-trap, geared parers; is solid and substantial, cannot get out of order, and so cheap as to be within the means of everybody.

Almost any of the Potato Parers in the market seem as if they might do the work better "next time," but the "White Mountain" DOES IT NOW.

EVERY MACHINE WARRANTED AS REPRESENTED.

Price to the Trade, \$8 per Dozen.

GOODELL CO., Antrim, N. H.
SOLE MANUFACTURERS.

COXE BROS. & CO.,
Cross Creek Lehigh Coal.

The Purity and Strength of this Coal especially adapt it for the working of Iron and Metals.

GENERAL OFFICE, Room 12 Trinity Building, 111 Broadway, New York
(Chicago, Ill., 54 Dearborn Street.
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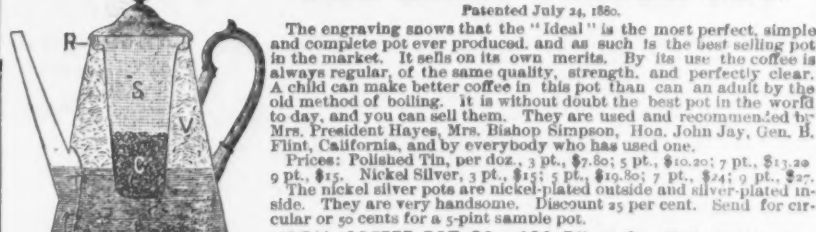
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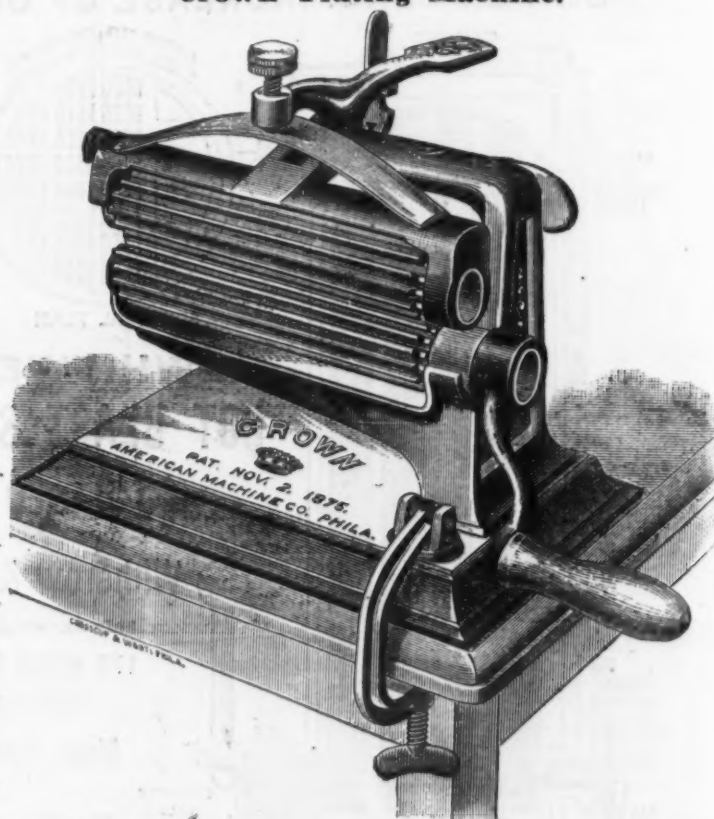
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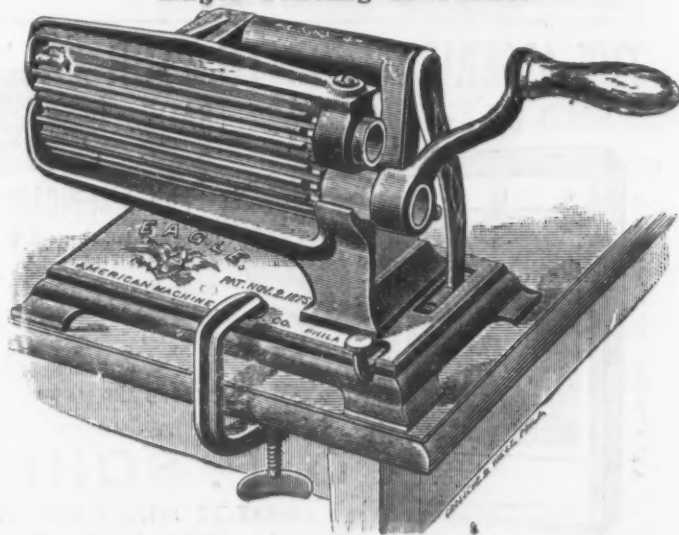
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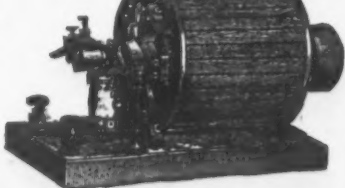
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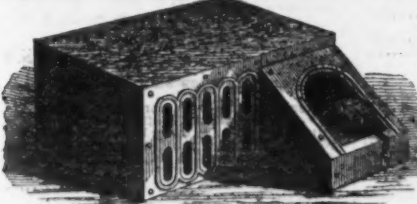
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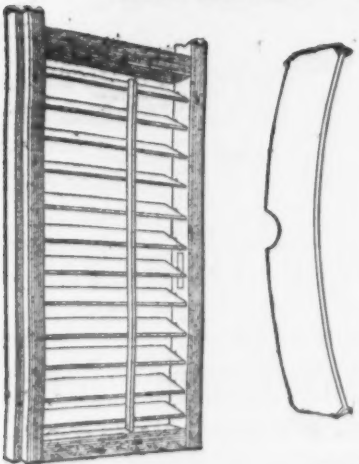
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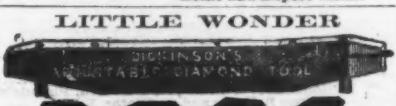
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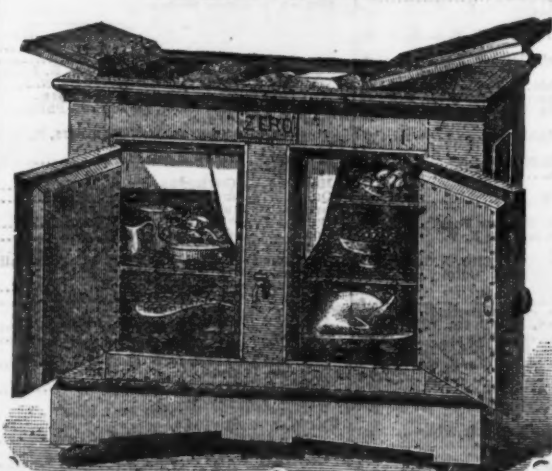
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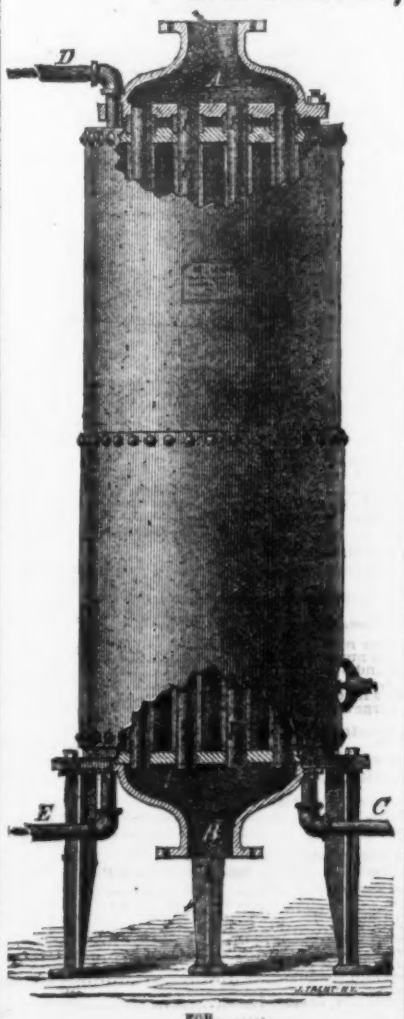
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To-day a decree in my suit against G. T. Fisher & Co., of Detroit, for an

infringement of my patent, was made and entered, of which the following is an extract:

At a session of the Circuit Court of the United States for the Eastern District of Michigan, held at Detroit,

&c., on Wednesday, the 8th day of December, 1880.

Present, Hon. H. B. Brown, District Judge.

NELSON LYON

vs.

GUYTON T. FISHER, et al.

It is ordered, adjudged and decreed, that the act entitled "An act for the relief of Nelson Lyon and Jerome

miah S. James," passed by Congress and approved April 1, 1880, &c., is a good, valid and constitutional act.

That the original patent, bearing date July 9, 1877, and numbered 138,491, granted and issued to Joseph

Baraloux, Jeremiah S. James and Nelson Lyon, when corrected by the Acting Commissioner of Patents, as

directed by said act, was a good and valid patent.

That the said Joseph Baraloux was the original and first inventor of the improvements in metallic stiffeners

for boots and shoes mentioned and described in said letters patent.

That the said Nelson Lyon is the assignee of said letters patent, and is a good and valid patent.

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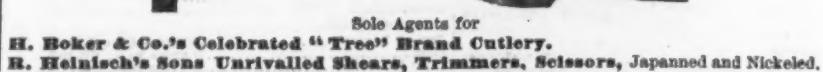
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18	X 30	10	8	7	6
18	X 36	10	8	7	6
24	X 36	10	8	7	6
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30	X 42	10	8	7	6
30	X 48	10	8	7	6
30	X 54	10	8	7	6
30	X 60	10	8	7	6
30	X 66	10	8	7	6
30	X 72	10	8	7	6
30	X 78	10	8	7	6
30	X 84	10	8	7	6
30	X 90	10	8	7	6
30	X 96	10	8	7	6
30	X 102	10	8	7	6
30	X 108	10	8	7	6
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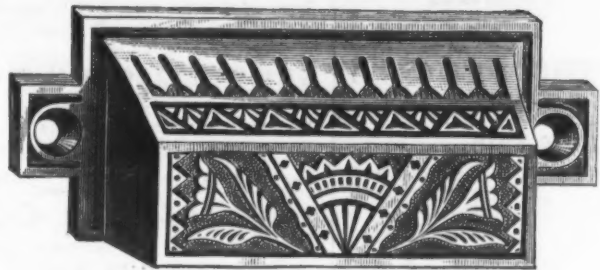
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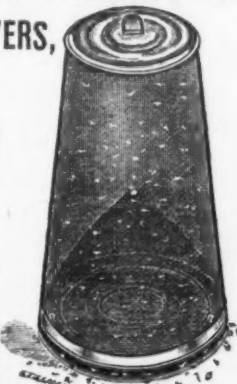
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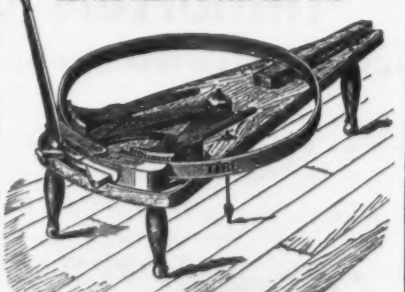
This laboratory was established in 1856, at the instance of a number of practical Iron Masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes. The object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

CHARGES TO IRON WORKS.

For determining the per cent. of Pure Iron in an ordinary Ore..... \$4.00
For the per cent. of Pure Iron, Sulphur and Phosphorus in do..... 12.50
For each additional constituent of usual occurrence..... 1.50
For those of unusual occurrence or difficult to determine, the charge must necessarily depend upon circumstances.
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For each additional constituent of usual occurrence..... 6.00
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For each additional constituent..... 2.00
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For determining the constituents of a Clay, Slag, Coke, or of an Ash in Coal the charges will correspond with those for the constituents of an ore.
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Printed instructions for obtaining proper average samples for analysis furnished upon application

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MEN AND AGENTS SHOULD READ THIS.



LITTLE GIANT WAGON TIRE UPSETTER.

This machine is strong, durable and cheap, and it superior to all others for upsetting or shrinking wagon tires, and bars of iron without cutting them. I will upset tires one inch at a heat, and is adapted to tires of any size or diameter. Every Blacksmith should have one; they are the best selling machines hardware merchants and agents ever handled. Price only \$12.00. Send for circular.

LITTLE GIANT MFG. CO.,
Millport, Chemung Co., N. Y.

EMPIRE STATE MFG. CO.
BUFFALO, N. Y.



Copper,
Half Copper,
Nickel Plated
TEA KETTLES.
Metal Spinning.

PHOENIX CASTER CO.,

Indianapolis, Ind.

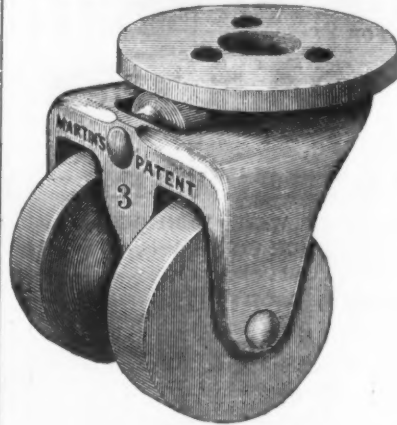
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Our Caster is no experiment. The people will have it, if it does cost more than the shams on the market. Eight-inch Mill Files are no better stock. Introduce yourself to these goods by a very small stock order of our selection. Terms, 60 days. Ship them back if they fail in your esteem. Send for catalogue.

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One Drawer is so constructed, simple, strong and effective, that it has nearly driven all competitors from the field.



Send for Price List to
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Twenty Styles.
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SPRING CALIPERS AND DIVIDERS.

Also, Surface Gauges and Counter Sinks, Stevens' Patent Breech-Loading Hunting Rifle, double and single barrel; Shot Guns, Pocket Rifles, Pocket Pistols, and the noted Hunters' Pet Rifles. Our Shooting Gallery Rifle is the favorite everywhere.



THE LEADING WRINGER OF AMERICA.

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PEERLESS

CLOTHES WRINGERS.

Sold by the Jobbing Trade everywhere. Most Saleable Wringer in the market.

MR. L. F. BLUE, who has been in our employ for a great many years, is our SOLE AGENT, and will visit the jobbing trade throughout the United States.

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SPECIALTIES: Fluting Machines, Hand Fluters, Planing Machines, Christmas Tree Holders, Bickford Portable Pump, Mrs. Potts' Patent Cold-Handle "Crown" Irons, Ice Cream Freezers and Cake Mixing Machines.

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WOLFF, KAHN & CO.,
MANUFACTURERS OF
Steel Wire

For All Purposes.
Special Finest CAST STEEL WIRE,
MARKET STEEL WIRE, PRIME COPPERED SPRING WIRE, TEMPERED AND UNTEMPERED STEEL WIRES, IN LONG LENGTHS, FOR CRINOLINE, CORSET, LOCK AND BRUSH MAKERS, AND ALL SPECIAL PURPOSES.
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OF EVERY DESCRIPTION.

WIRE RODS, PLAIN AND GALVANIZED WIRES, &c.,
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Shipments in bond from American Ports and direct from Europe to all parts of the World.
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Direct all communications to the

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Pittsburgh, Pa.,
Manufacturers of

CRESCENT STEEL,

In Bars, Sheets, Cold-Rolled Strips, &c.
Polished, Compressed Drill Rods and Wire.

Warranted equal to any imported in quality, finish and accuracy.

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Established 1810.
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"DOG BRAND" FILES.

Also of Superior

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For Drills, Cold Chisels, Tools, Taps, Dies, &c.
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Best Warranted Cast Steel for Machinists' Tools,

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Extra Mild Center Steel, special for Taps,

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STEEL Gautier Steel.

See Page 3.

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NEWARK STEEL WORKS.
BENJAMIN ATHA & CO.,
Manufacturers of
BEST REFINED CAST STEEL

And grades of Steel specially adapted for Lathe Tools, Chisels and Taps and Dies.

Warranted most superior for TOOLS AND GRANITE ROCK DRILLS.

A full assortment of this universally approved OLD BRAND and other Steels for sale by

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MANUFACTURERS OF

BESSEMER STEEL RAILS,

Machinery Steel, Merchant and Ship Iron.

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Sole Manufact'rs of **"CHOICE"** Extra Cast Steel.

Manufacturers of all Descriptions of Steel.

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THE STEEL COMPANY OF SCOTLAND, LIMITED,

(SIEMENS' PROCESS),

MANUFACTURERS OF

Steel Rails,

Steel Ship Plates.

Steel Blooms for Rails,

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Steel Wire Rods,

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Resident Agents for the United States,

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MANUFACTURERS AND

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Removed to 30 Gold Street, New York.

Particular attention is paid to quality and temper for FILES, SAWS, EDGE TOOLS, FILE and POCKET CUTLERY, TOOLS, TAPS and DIES; also for COLD ROLLED STEEL for CLOCK SPRINGS, CORSET CLASPS, &c.

A Large Assorted Stock of JOHN ROTHERY'S FILES always on hand.

Warranted Superior to any Steel in the Market, either English or American, for every purpose.

Also,

Combination Chrome Steel and Iron for Safes, Jails and Deposit Vaults.

Send for Circular and Price List.

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Chicago Branch,

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JOLIET STEEL COMPANY,

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Steel Rails,

ALL WEIGHTS.

The Company warrant its Rails equal in quality to any manufactured in the United States.

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W. R. STIRLING, Treasurer;

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Office, Rooms D and E, Honore Building.

H. S. SMITH, General Sup't.

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Works, Joliet, Ill.

Steel.
R. MUSHET'S
Special Steel

FOR
LATHES, PLANERS, &c.

Turns out at least double work by increased speed and feed, and cuts harder metals than any other Steel. Neither hardening nor tempering required.

Sole Makers,

SAMUEL OSBORN & CO.,

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"Benzon" Homogeneous Plates

For Boilers, Fire-boxes, &c.

Axles, Crank Pins, Spring Steel,

And all other kinds of

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For Railroad purposes, &c.

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IRON AND STEEL RAILS,

SWEDISH IRON,

Tin and Terne Plates and Metals.

H. & A. CARTER,

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Cannon Street, London, E. C.

Iron and Steel Merchants.

Exporters of Iron and Steel Rails, Blooms, Spiegeleisen, Pig Iron, Cast Iron, Old Rails and Scrap, Iron Ore, &c. Sole agents for the sale of the Vena Dulce (Somorostro) Iron Ore from the Magdalena Mine. Shipping Port: Bilbao.

Analysis of "Magdalena" Ore.

Silica..... 4.05

Peroxide of Iron..... 84.60

Oxide of Manganese..... 1.64

Alumina..... 1.24

Lime..... 0.33

Magnesia..... 0.04

Phosphoric Acid..... 0.04

Sulphuric Acid..... 0.48

Combined Water..... 5.97

Moisture..... 2.43

100.43

Metallic Iron..... 99.79

The Sulphuric Acid exists as Sulphate of Lime and is, in my opinion, not detrimental.

Signed, E. D. RILEY, F. C. S.

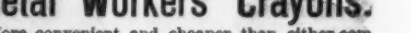
Cable address:

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Metal Workers' Crayons.

More convenient and cheaper than either common or French chalk. For manufacturers of all sheet metals, metal workers, machinists, blacksmiths, &c. Send for sample and price list.

D. M. STEWARD,

Sole Manufacturer,

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Gunpowder.

GUNPOWDER.

DUPONT'S

Rifle, Sporting and Blasting Powder

The most popular Powder in use.

Dupont's Gunpowder Mills, established in 1801 and 1802, have maintained their great reputation for 78 years. Manufacture the following celebrated brands of Powder:

DUPONT'S DIAMOND GRAIN,

Nos. 1 (coarse) to 4 (fine), unequalled in strength, quickness and cleanliness; adapted for Glass Ball and Pigeon Shooting.

DUPONT'S EAGLE DUCKING,

Nos. 1 (coarse) to 3 (fine), burning slowly, strong and clean; great penetration; adapted for Glass Ball Pigeon, Duck and other shooting.

DUPONT'S EAGLE RIFLE,

A quick, strong, clean Powder of very fine grain for Pistol and Rifle shooting.

DUPONT'S RIFLE, Fg. "Sea Shooting,"

FFg and FFFg.—The Fg for long range rifle shooting, the FFg and FFFg for general use, burning strong and moist.

Also all kinds of Sporting, Mining, Shipping and Blasting Powders of all sizes and descriptions. Special grades for experts. Also, Musket, Cannon, Mortar and Mammoth Powder, U. S. Government standard. Powder manufactured to order of any required grain or proof. Agencies in all cities and principal towns throughout the U. S. Represented by

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N. B.—Use none but Dupont's Fg or FFg Powder for long-range rifle shooting.

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Manufacture and sell the following celebrated brands of sporting Powder known everywhere as

ORANGE LIGHTNING,

ORANGE DUCKING,

ORANGE RIFLE

more popular than any Powder now in use.

Blasting Powder and Electrical Blasting Apparatus.

Military Powder on hand and made to order.

SAFETY FUSE, FRICTIONAL & PLATINUM FUSES.

Pamphlets showing sizes of grain sent free.

Steel.

NORTH CHICAGO ROLLING MILL CO.

ESTABLISHED 1857. CAPITAL, \$3,000,000. INCORPORATED 1869.
Works at Chicago, Ill., and Milwaukee, Wis.
MANUFACTURERS OF
MERCHANT BAR, FISH PLATES, PIG METAL,
IRON RAILS & BESSEMER STEEL RAILS.
Fish Plates.....13,000 tons
Merchant Bar.....40,000 "
Pig Metal.....120,000 "
Iron Rails.....110,000 "
Steel Rails.....100,000 "
Total Capacity per year.....483,000 "

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37 Mitchell Block, Milwaukee, Wis.
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THE SIEMENS-ANDERSON STEEL CO.,

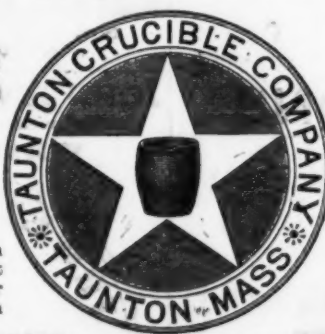
Successors to ANDERSON & CO.,
Manufacturers of
Crucible Tool, Cast Spring, Cast Plow, Iron Centre,
Soft Centre, and Iron Back Plow, also Open Hearth
Spring, Tire, Plow, Machinery, and
ALL DESCRIPTIONS OF STEEL.
And Sole Proprietors of the Siemens Direct Process in the United States.

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All the regular sizes in stock, with nozzles to fit each size. Special sizes or shapes made to order from sample or drawing.



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**SOHO IRON MILLS.
MOORHEAD & CO.,**

MANUFACTURERS OF
GALVANIZED SHEET IRON,

Juniata, Charcoal and Common.
Sheet & Plate Iron,
And Special Sizes for Sap Pans.

PITTSBURGH, - - - - - PENN.

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SECOND QUALITY



NOTICE.

Hereafter our GALVANIZED SHEET IRON will be branded as per cuts in margin. We have adopted these

TRADE MARKS

to protect ourselves and the trade against imitations of our iron, as was the case under our old brands.



THIRD QUALITY

as heretofore

MOORHEAD & COMPANY
SOHO MILLS
PITTSBURGH.

MOORHEAD & CO.
January 1, 1881.

REFINED.

**BUFFALO CHAMPION
ICE CREAM FREEZERS.**

FOUR STYLES.

FIFTEEN SIZES.

THE BEST
ICE CREAM FREEZER
IN MARKET.

Please send for Illustrated and Descriptive Price List.

Sidney Shepard & Co.
PROPRIETORS

BUFFALO STAMPING WORKS,

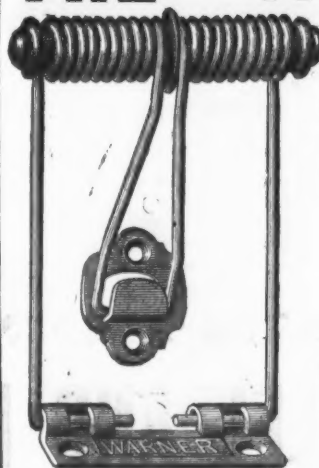
BUFFALO, N. Y.,

AND

CHICAGO, ILL.



THE "WARNER" DOOR SPRINGS



are the most simple, most effective and most convenient ever introduced, and the immense sale we are having shows their great popularity and superiority.

There never was a Spring made that is so durable, so complete in its action, operating with a uniform pressure, holding the door tight when closed, and allowing it to open without increasing the pressure at any point.

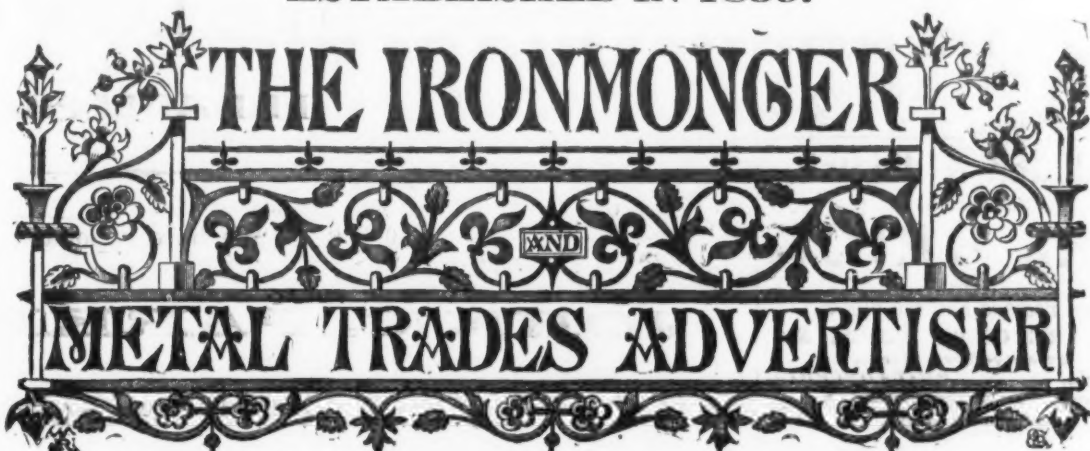
When the door is opened about 130 degrees of a circle, it will press and hold it open. The Spring is easily unhooked and rehooked—in an instant—from the door and also from the jamb, without removing a screw or pin.

This is a Convenience Possessed by no other Spring in the Market.

We are making this season three sizes, viz:
No. 1 For Screen or Light Storm Doors.
No. 2 For Medium Doors.
No. 3 For Heavy Doors.
They are for sale by most of the prominent jobbers of the United States and Canada.
Correspondence solicited.

FREDERIC BARTLETT,
FREEPORT, ILLINOIS.

ESTABLISHED IN 1859.



THE IRONMONGER

METAL TRADES ADVERTISER

PUBLISHED EVERY SATURDAY.

THE OLDEST AND CHIEF REPRESENTATIVE OF THE IRON, HARDWARE AND METAL TRADES.

OFFICE: 44a CANNON STREET, LONDON, E. C.

ADVERTISEMENTS AND SUBSCRIPTIONS ARE RECEIVED AT THE VARIOUS OFFICES OF "THE IRON AGE," NAMELY:

NEW YORK OFFICE: DAVID WILLIAMS, Publisher of *The Iron Age*, 83 Reade street.
PITTSBURGH OFFICE: 77 Fourth Avenue—JOS. D. WEEKS, Manager and Associate Editor.
PHILADELPHIA OFFICE: 220 South Fourth Street—THOMAS HOBSON, Manager.
CINCINNATI OFFICE: Builders' Exchange—T. T. MOORE, Manager.
SOUTHERN OFFICE: Cor. Eighth and Market Streets, Chattanooga, Tenn.—S. B. LOWE, Manager.

SPECIAL FEATURES.

Notes of Novelties.—This is a department of the journal always watched with interest by the trade, as it contains an account, from week to week, of the novelties which manufacturers and inventors are introducing to the notice of the trade. These articles are freely illustrated.
Special Correspondents.—The *Ironmonger* has a special correspondence from all the principal Continental, British and manufacturing centers. The writers are gentlemen holding important positions in the districts with which they are connected, and possess facilities for acquiring information specially suited for the columns of the *Ironmonger*. *The Week, Legal Notes, Trade Notes, Bankruptcies, Foreign Notes, Colonial Notes, Merchants' Circulars, &c.*, are each departments of the journal, containing a digest of all matters of direct interest to the Iron, Hardware and Metal Trades. In addition to the above, there is a carefully classified list of Patents, together with Editorial Notes, French, Belgian and other Special Correspondence.

SUBSCRIPTIONS

to the *Ironmonger* and *Metal Trades Advertiser*, with which is sent every fourth week the Foreign Supplement (see below), may commence from any date, but are not received for less than a year complete. The rate is \$5 per annum, inclusive of postage to any part of the world outside Great Britain. To every subscriber is presented, free, in the course of his year, a handsome and useful *Ironmongers' Diary and Text Book*, a work sold to non-subscribers at 75 cents.

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In the spring and autumn of each year there is published a Special Issue, the circulation of which is not less than Twelve Thousand (12,000) copies.

THE IRONMONGERS' DIARY AND TEXT BOOK.

This is an annual, presented free to every Subscriber to the *IRONMONGER AND METAL TRADES' ADVERTISER*. It contains a large number of ruled skeleton pages for diary and other entries, and in addition much useful reference information, varied from year to year. It is handsomely bound in cloth, gilt; and as copies are used in thousands of establishments for a whole year, it is obviously a medium of exceptional value for advertisements. Sold to non-subscribers at 75 cents.

THE FOREIGN SUPPLEMENT

is published every fourth week in connection with the extensive and world-wide circulation of the *Ironmonger* itself. The dates of its publication for the next twelve months will be as follows:
JUNE 25, JULY 25, AUGUST 25, SEPTEMBER 17, OCTOBER 8, NOVEMBER 6, DECEMBER 3 and 31, JANUARY 28, FEBRUARY 25, MARCH 25, APRIL 22, and MAY 20, 1882.

This Supplement is published in

FIVE LEADING COMMERCIAL LANGUAGES

of the world, including English, and is sent to all the countries where they are spoken, thus placing the contents of the *Ironmonger* not only within reach but in the native language of eighty millions of German, forty-two millions of French, twenty-eight millions of Italian, and fifty-one millions of Spanish speaking people; or, in all, over two hundred millions of inhabitants in the principal nations where the best purchasers of manufactured goods are to be found.

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THE WHOLE FOREIGN HARDWARE TRADE,

so far as our experience of twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. Thus a Price List or Advertisement inserted in the *Ironmonger* and *FOREIGN SUPPLEMENT* is a strikingly powerful and most efficient way of publicity not to be compared with any of the other ordinary channels of communication.

B. KREISCHER & SONS, FIRE BRICK.

BEST AND CHEAPEST.
Established 1845.
Office, foot of Houston Street, East River,
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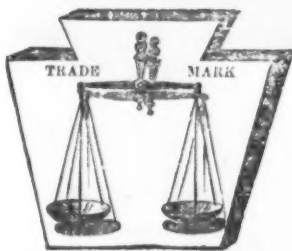
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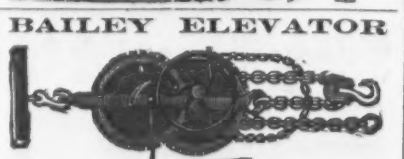
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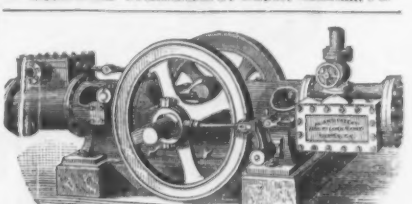
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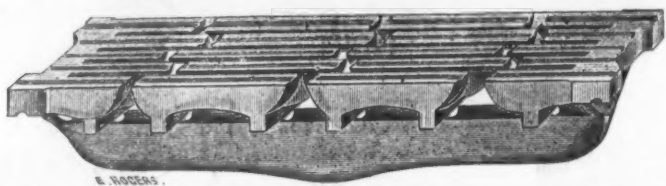
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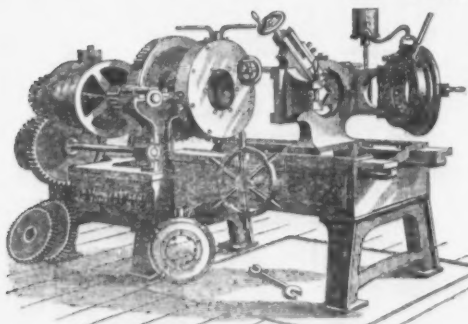
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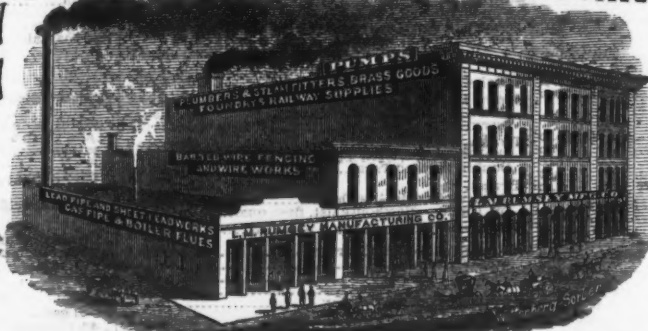
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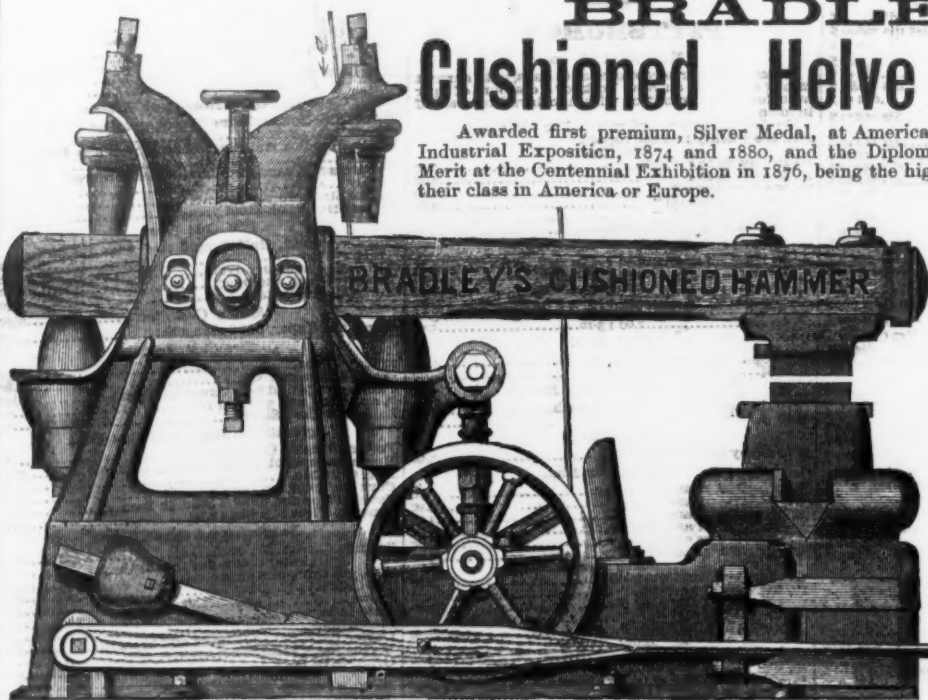


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CHAS. BENEDICT.

From Union Water Meter Company, Worcester.

We have used one of B. Fitts' Patent Magnetic Metal Separators for eighteen months, and can recommend it as the best thing we have ever seen for separating metals, and have no doubt it has more than paid for itself in its use. UNION WATER METER CO.

WORCESTER, Sept. 1, 1890. J. C. OTIS, Treas.

From Peck Brothers & Co., New Haven, Conn.

NEW HAVEN, CONN., Sept. 3, 1890.

Ezra Sawyer, Esq.—DEAR SIR: We are pleased to inform you that the machine we purchased of you for cleaning our turnings and sweepings works admirably, and does its work thoroughly. It will very soon earn all its cost us. Respectfully yours,

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From Rice, Barton & Fales Machine and Iron Co.,

Worcester, Mass.

Worcester, Mass., Sept. 4, 1890.

To Whom it may concern: We have had in use for several months one of B. Fitts' Patent Magnetic Metal Separators, and it gives us satisfaction, effecting a saving in time and material. Yours respectfully,

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From Brown & Brothers, Waterbury, Conn.

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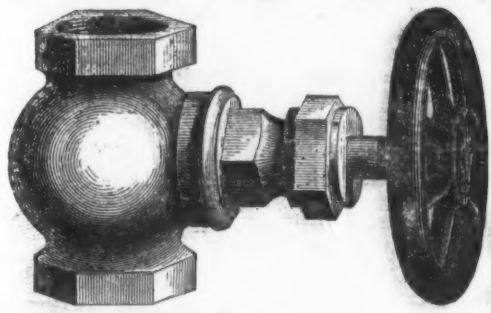
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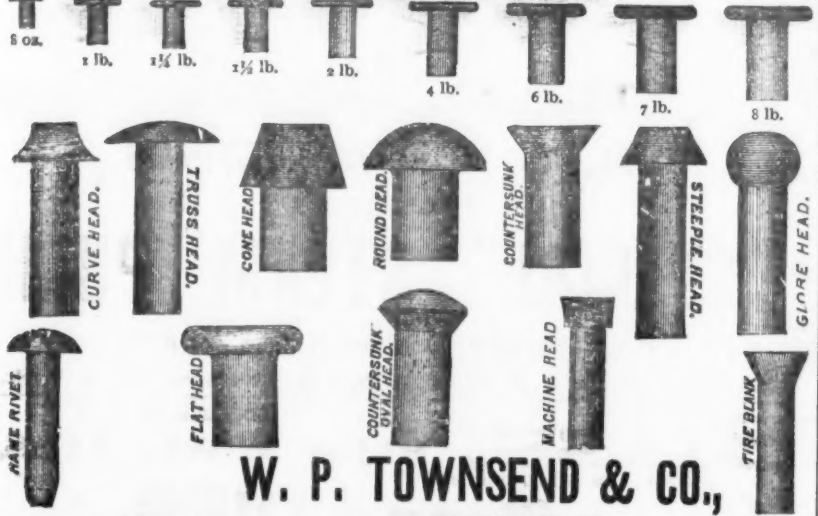


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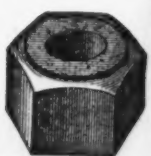
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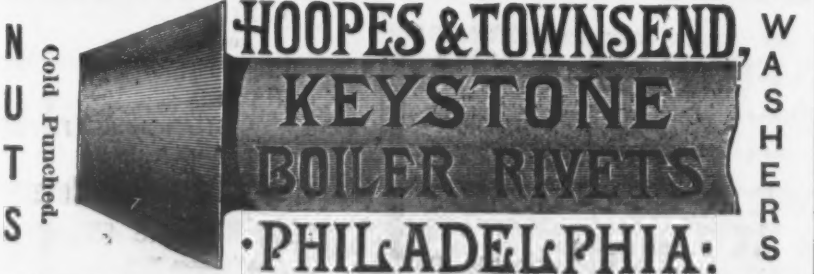
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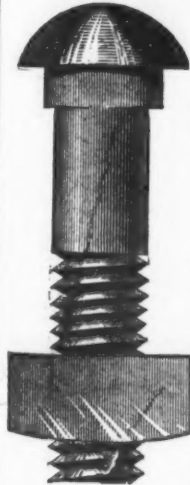
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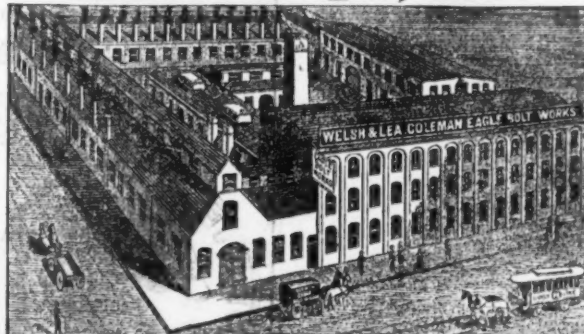
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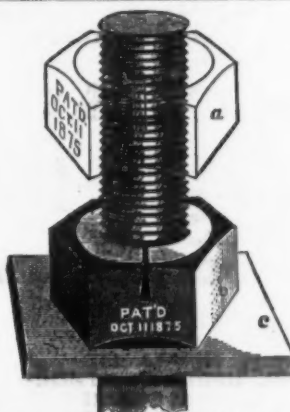
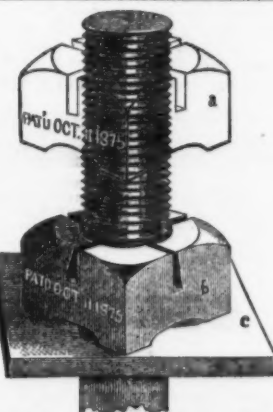
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The Boston and Albany Railroad were the first to use the Safety Nut, and are now putting it on to their ENGINES, CARS AND TRACKS.

We would respectfully refer you to the New York Central and Hudson River Railroad Co., New York. Also, Boston and Albany Railroad Co.; Wilson Eddy master mechanic; F. D. Adams, Supt. car department; W. H. Russell, chief engineer and road master; G. R. Hardy, ass't engineer. Other large railroads are now using the Safety Nut, to whom we will refer if desired.

We would like to have you try the Nut, and we are certain you will use it afterwards altogether.

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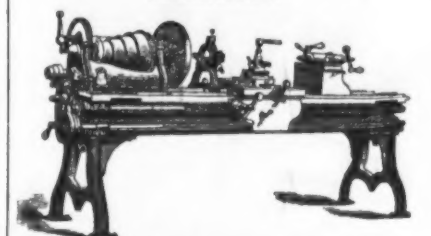
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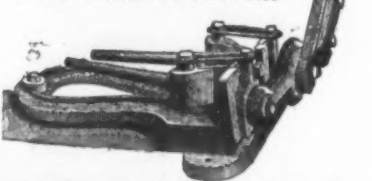
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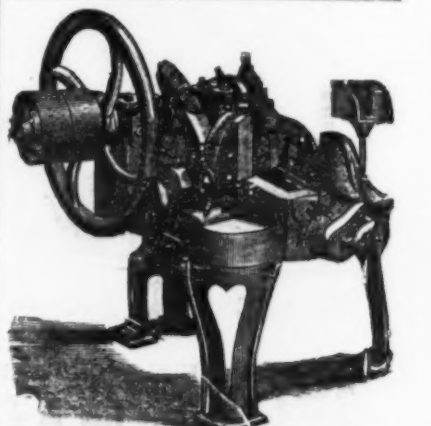
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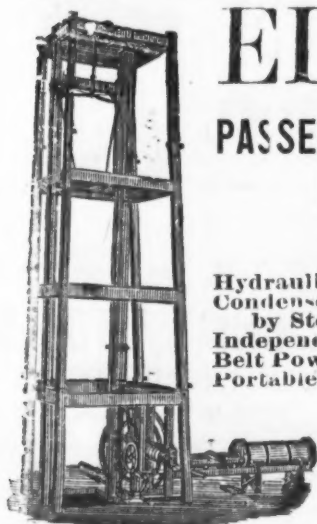
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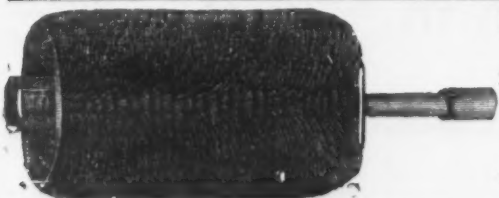
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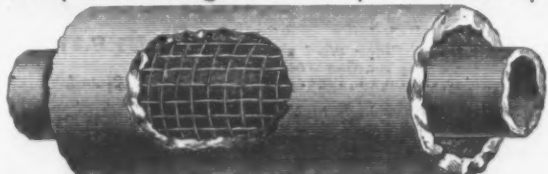
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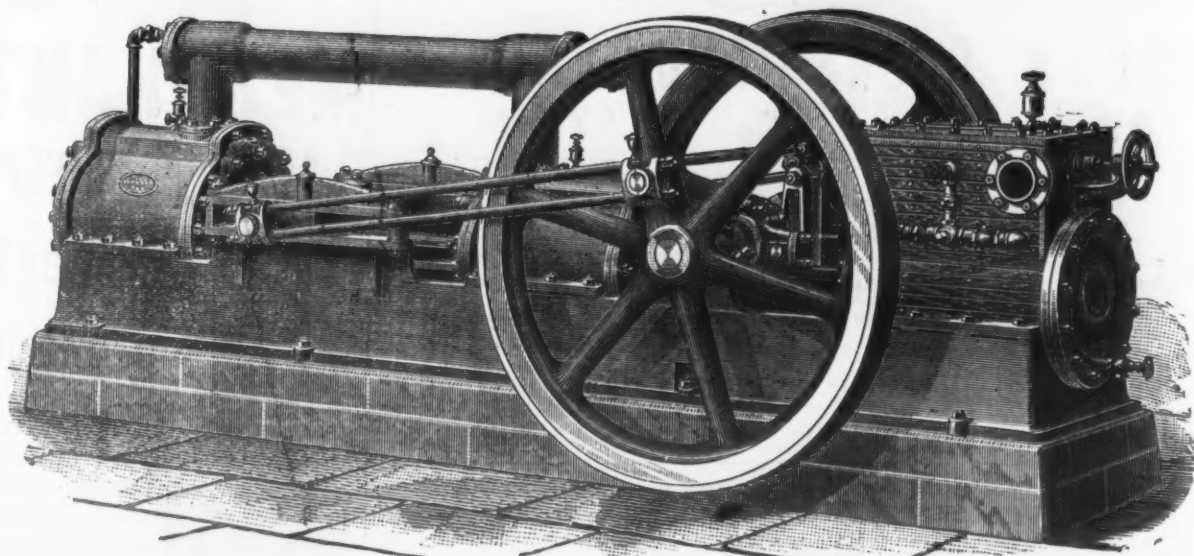
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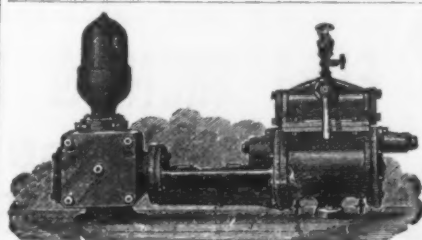
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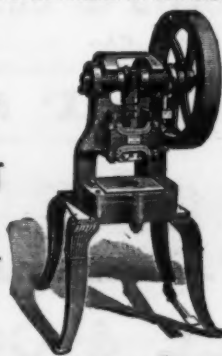
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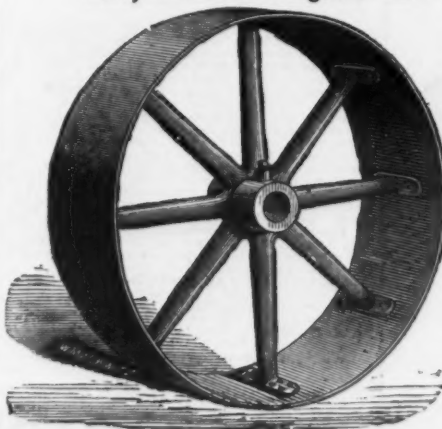
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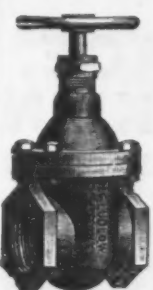
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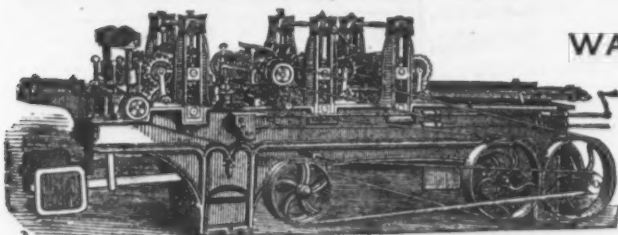
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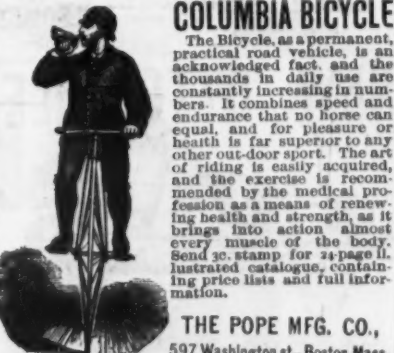
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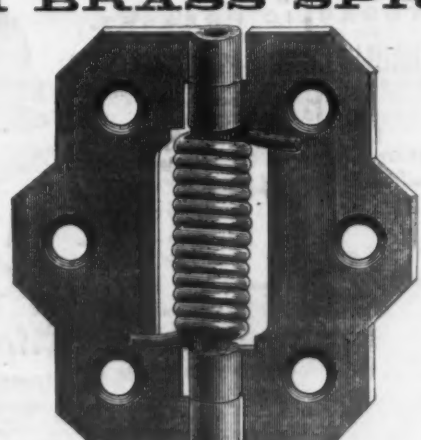
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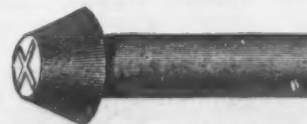
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